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GENTES HERBARUM

PALMÆ INCERTÆ ET NOVÆ

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VOL. VIII ITHACA, NEW YORK FASC. II

GENTES HERBARUM

Occasional Papers on the Kinds of Plants

PALMS UNCERTAIN AND NEW

by L. H. Bailey
assisted by H. E. Moore, Jr.

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4. COCCOTHRINAX SABANA, in the crater of Saba, settlement of Bottom, Netherlands West Indies. Note the odd "hang" of the foliage. Some of the leaves have been removed for brooms or other uses. See page 110.

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ARTICLE 4.
PALMS UNCERTAIN AND NEW.

The collections of herbarium material of palms at the Hortorium grow rapidly, and many new and difficult problems arise in efforts to identify them. These problems are likely to acquire novel aspects from the fact that most collectors now apprehend what is required in preserved palm material to make it understandable. If one is to comprehend the species of palms, great numbers of which probably are yet unnamed and unknown, the old idea of merely saving space in the herbarium must be abandoned, and as far as possible the specimens should be supplemented by good photographs and notes taken in the field.

Studies are proceeding at the Hortorium on a number of the large and perplexing genera of palms, but much time and patience are required for such investigations to mature, and journeys to palm regions must be undertaken. In the present Fascicle a number of miscellaneous studies, extended over the years, have been brought together. In this work I have had the efficient aid of Harold Emery Moore, Jr., taxonomist in the Hortorium, who has had good experience in tropical botany. Many of the species are attributed to him in the text and he has prepared the diagnoses and discussions of them; remainder of the novelties are by L. H. Bailey.

Drawings are the handiwork of Miss Marion E. Ruff, Hortorium illustrator. Photographs are by the author, with the exception of Figs. 24, 41–43, 45–47.

LMS

Following are genera discussed in this Fascicle:

Thrinax, Coccothrinax, page 94
Roystonea, page 114
Acrocomia, page 135
Astrocaryum, page 147
Bactris, page 153
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Desmoncus, page 177
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Hyospathe, page 195
Synechanthus, page 199
Morenia, page 203

1. BROOM PALMS IN THE LESSER ANTILLES: THRINAX, COCCOTHRINAX

Here we come to a new evaluation of certain palms indigenous in a chain of islands, many of the islands very small yet verdurous. It is customary to accept them as a single botanical series, one species of major plant indifferently inhabiting all of them. Now we are to challenge this concept in two related groups of palms that are characteristic of the region from the islands and restricted mainlands of southern Florida to Trinidad, with recent unstudied fragments from the western shores in British Honduras and Yucatan. They frequent particularly calcareous uplands, ridges and bluffs. Problems of isolation in the assumed milleniums of separation of these islands will suggest themselves for future biogeographical study. We are to apprehend much more than the mere identification of species of plants; yet we may bear in mind the thesis in Alfred Russel Wallace's masterful book, Island Life, that it is in the study of species rather than of genera that the results of evolution become more readily manifest.

We shall develop a new attitude on the old floras of the Lesser Antilles.

In the study of insular floras we are allowed to remember that species often may be separated on lesser characters than are accepted for continental mainlands inasmuch as variation is restricted and the islands themselves constitute the ranges and provide the reasons.

The only person to attempt a study of the broom palms of the Lesser Antilles was Odoardo Beccari in the second volume of Martelli's Webbia published in Florence, Italy, in 1907. The present paper extends his program; and for the first time the treatment is pictorialized. It remains for future observation to determine how uniformly these discriminating marks hold as between the different islands. Any treatment of the Thrinax-Coccothrinax group in the present epoch is, in the nature of the case, only preliminary.

The Lesser Antilles begin with Vieques, close by Puerto Rico and under its government, where years ago I collected the palms along with other plants, and they extend in great numbers south and westward through the American Virgins, British Virgins and Leewards, British Windwards, Netherlands West Indies, French West Indies, Barbados, Trinidad and Tobago. Only one new broom palm has been described recently as based on these islands,—*Coccothrinax australis*, Bailey, of Trinidad-Tobago, although fugitive botanical names have been assigned to them.

Sufficient material is not yet in existence to complete a Coccothrinax survey of all the Lesser islands. I await fruits and other parts particularly from St. Eustatius, St. Martin, St. Bartholomew, Tortola, St. Kitts, Antigua, St. Lucia, Dominica, to supplement my collections. On some

islands the occurrences are very local, and on at least three of them I found the trees that old and experienced residents had declared did not exist there. Perhaps in some cases the species are slowly becoming extinct.

One reason for the incompleteness of specimens is the fact that broom palms are seasonal bloomers, usually once in the year. The collector may not be in attendance at the season of flowers or fruits, an epoch that may vary as between several islands. In some cases, also, a tree or a colony may be sterile year after year.

When Britton was studying the palm flora of the West Indian region he remarked that these two groups are the most difficult of determination of any of the genera. My own experience over many years confirms the difficulty of making out specific lines as between the different islands. The initial doubt is the identity of the early species, *Thrinax parviflora* of Swartz, 1797, attributed to Jamaica and Hispaniola, *Palma argentata* of Jacquin, 1803, assigned to the Bahamas, *Thrinax argentea* of Loddiges, 1830, Hispaniola, and others. The second difficulty is the meaning or significance of the endless variations throughout the long broken ranges. There is strong indication that differences of specific value inhere to various islands, and that the species are endemic; yet when fragments and snips are crumpled up and pressed and put into the herbarium, often with important parts wholly missing and seldom any two of the collections comparable, the puzzlement becomes insolvable. We confidently accept *Thrinax Morrisii*, Wendl., endemic to the little islands Anagada and Anguilla, and *T. Ekmanii* to the islet Navassa; other accepted species are endemic (or confined) to certain restricted parts of the larger islands. Probably we shall recognize many separates when we learn how to define the broom palms. Some of the accepted "good" species probably include different independent things. We have noted the species added to Roystonea, Aiphanes and Acrocomia in these islands, and now others are to follow.

A third difficulty in study of the broom palms is the confusion from the fugitive or floating binomials that have been attached to plants in cultivation; the plants make good pot and tub specimens, and the little trees are seen frequently about habitations in the tropics with nobody knowing their sources. Moreover, some of the more or less botanically described names are little better than the garden names as to identification. In fact, most of the published binomials in the group can never be identified, and we should be allowed or even encouraged to discard them.

The broom palms have been relieved of two of their species in recent time by Bailey in attempts at "clarifying the genus Coccothrinax": *Zombia antillarum* (*Coccothrinax anomala*, Becc.) in Gentes Herbarum, iv, pages

239–246 (1939), *Haitiella Ekmanii* (*Coccothrinax Ekmanii*, Burret), in Contributions from the Gray Herbarium, clxv, pages 5–9 (1947).

Before proceeding to the Lesser Antilles we may review briefly the broom palms accredited to the Greater Antilles and other regions.

There are two main or paramount species, of wide distribution, in each of the two genera, but from the concept of which other species may be separated or to which they may be restored in years to come: *Thrinax parviflora*, Sw., with flowers and fruits pedicellate, Florida to Hispaniola, apparently in Yucatan and British Honduras; *T. microcarpa*, Sarg., floral parts sessile, Florida to Puerto Rico, northern Lesser Antilles, supposedly also in Yucatan and British Honduras; *Coccothrinax fragrans*, Burret, flowers and fruits pedicellate, Cuba, Jamaica, Hispaniola; *C. argentea*, Sarg., floral parts sessile, Cuba, Hispaniola.

In Florida and its keys, I now know two indigenous species of Thrinax, *T. parviflora*, Sw., *T. microcarpa*, Sarg., and only one Coccothrinax, *C. argentata*, Bailey (*Palma argentata* of Jacquin).

In the Bahamas we have *Thrinax parviflora*, *T. microcarpa* (*T. bahamensis*, O. F. Cook), and *Coccothrinax argentata*.

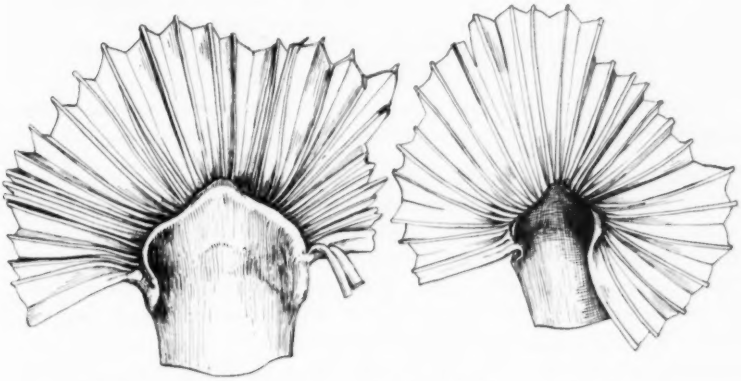
The great island of Cuba yields three species of Thrinax, all of which are endemic, and twenty-one species of Coccothrinax, twenty of them, as well as several botanical varieties, endemic: see Hermano León, Contribución al Estudio de las Palmas de Cuba in Las Memorias de la Sociedad Cubana de Historia Natural, xiii, pages 107–156 (1939); also Flora de Cuba, volume 1, 260–269 (1946).

On Jamaica we know six Thrinaces: see Bailey, Gentes Herbarum, iv, 135–148 (1938); of Coccothrinax we now admit only one, *C. fragrans*, Burret: Gentes Herbarum, iv, 256 (1939).

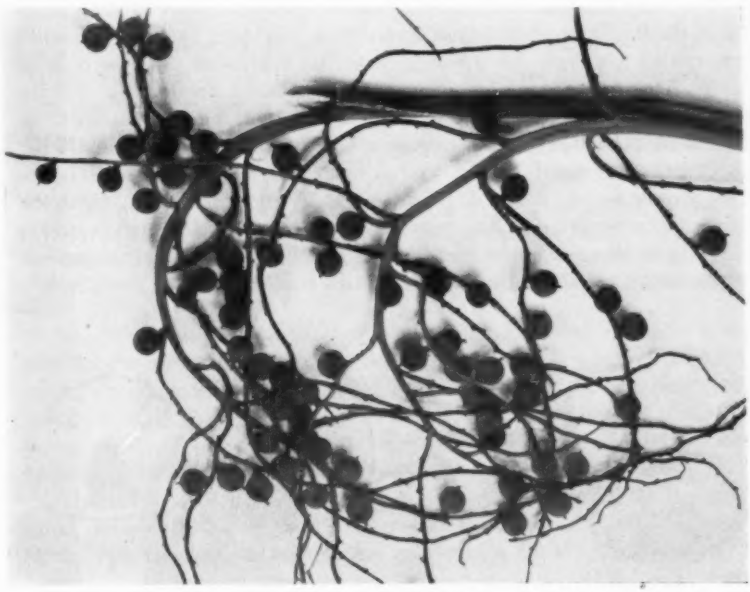
Hispaniola (Haiti, Santo Domingo), according to Moscoso's recent (1945) Palmas Dominicanas in volume xxxiii of Publicationes de la Universidad de Santo Domingo, yields one species of Thrinax, *T. parviflora*, Sw., probably also *T. microcarpa*, Sarg., and *T. Ekmanii* on the Haitian islet of Navassa between Haiti and Jamaica; also six species of Coccothrinax as well as *Zombia antillarum*, Bailey (*C. anomala*, Becc.) and *Haitiella Ekmanii*, Bailey (*C. Ekmanii*, Burret). See, also, Moscoso, Catalogus Floræ Domingensis, 1943.

Broom palms currently assigned to Puerto Rico, according to the foregoing citations of Bailey, are *Thrinax microcarpa*, Sarg., and *Coccothrinax alta*, Becc. I must now recognize another Thrinax, *T. ponceana*, on that island because of my study of it from collections made in 1949 on dry hills near Ponce, my previous collections in that vicinity having been less satisfactory:

Thrinax ponceana, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 536, t. 45 (1901). Figs. 5, 6, 7.



5. HASTULAS of *Thrinax microcarpa* left, and *T. ponceana* right. ×⅔.



6. THRINAX PONCEANA spadix with fruits. ×½.

Mostly a small condensed palm 1–3 or 4 m. tall, customarily referred to *T. microcarpa* but distinguished by smaller leaves that are green or nearly so underneath, hastula smaller, incurved, narrow and lacking broad apical part and its base about 1 cm. across, flower-clusters smaller, fruit averaging smaller, 2.5–4 mm. diameter and usually more evidently pointed and pedicels slightly developed, centralium of seed very broad and scarcely reaching beyond the center of the albumen, embryo lateral.

Dry rocky calcareous lands and on the southern side or coastal prominence of Puerto Rico.

Thrinax and Coccothrinax look much alike as one sees the trees in nature. I do not know any single mark that infallibly differentiates them in the gross; therefore herbarium leaves of them do not lead to enlightenment. The genera are abundantly distinct, however, in their flowers and fruits. Flowers are hermaphrodite. Pistil is morphologically tricarpellary but two of the carpels are suppressed so that the seed is single and also simple. When the white albumen is deeply invaded by intrusions from the periphery the seed may look like a policarpy fruit, yet it is not so. In all cases, satisfactory study of broom palms requires mature fruits and seeds as well as hastulas (upper face of ligules) of full-grown not juvenile leaves.

The foregoing remark about the necessity of ripe fruits is well exemplified in the floating name *Thrinax barbadensis*, used long ago by the English nurseryman Loddiges for a young palm in cultivation, known only in foliage. This name was given more or less botanical standing by Martius in 1838 (Hist. Nat. Palm. iii, 257), but there is nothing in the account to place it in either the genus Thrinax or Coccothrinax or even some other assemblage; nor can I assume that a palm assigned to Barbados is the same species as one native in Guadeloupe. Therefore we must treat the entry of this supposedly Barbadan subject as a *nomen subnudum et confusum*, notwithstanding the fact that Beccari has transferred the name as *Coccothrinax barbadensis* for a palm native in Guadeloupe. The name is

7. FRUIT AND THREE SEEDS of *Thrinax ponceana*; first seed, top view, then bottom view and cross-section, × about 8.

discontinued in my treatments (see Bailey, Gent. Herb. iv, 149, and *Coccothrinax Dussiana*, page 109).

THRINAX, L. f. ex Sw. PEABERRY PALMS.

Stamens 6: fruit white or yellowish at fresh maturity; seed not lined or sulcate, with solid or continuous hard albumen unless for a central cavitous intrusion or centralium from the base that extends part way or whole way into the body.

A. Flowers and fruits distinctly pedicellate.....1. *T. parviflora*
AA. Flowers and fruits sessile.
B. Leaves silvery underneath: tree.....2. *T. microcarpa*
BB. Leaves green underneath: bush.....3. *T. Morrisii*

1. **Thrinax parviflora,** Sw. Fl. Ind. Occ. i, 614, t. 13 (1797). Fig. 8.

Described in Gentes Herbarum, iv, 135 (1938). St. Eustatius, Netherlands West Indies, Marie Gorie hills, 70 m. altitude, *Bailey 611.*

2. **Thrinax microcarpa,** Sarg. in Garden and Forest, ix, 162 (1896). Figs. 5, 8.

Described in Gentes Herbarum, iv, 141. "Most widely spread of the Thrinaces," supposed to be on the Lesser Antilles, but I have no specimens from there.

3. **Thrinax Morrisii,** Wendl. in Gard. Chron. ser. iii, ix, 700 (1891).

Described in Gentes Herbarum, iv, 143. Anguilla and Anegada islands near Puerto Rico; also in cultivation.

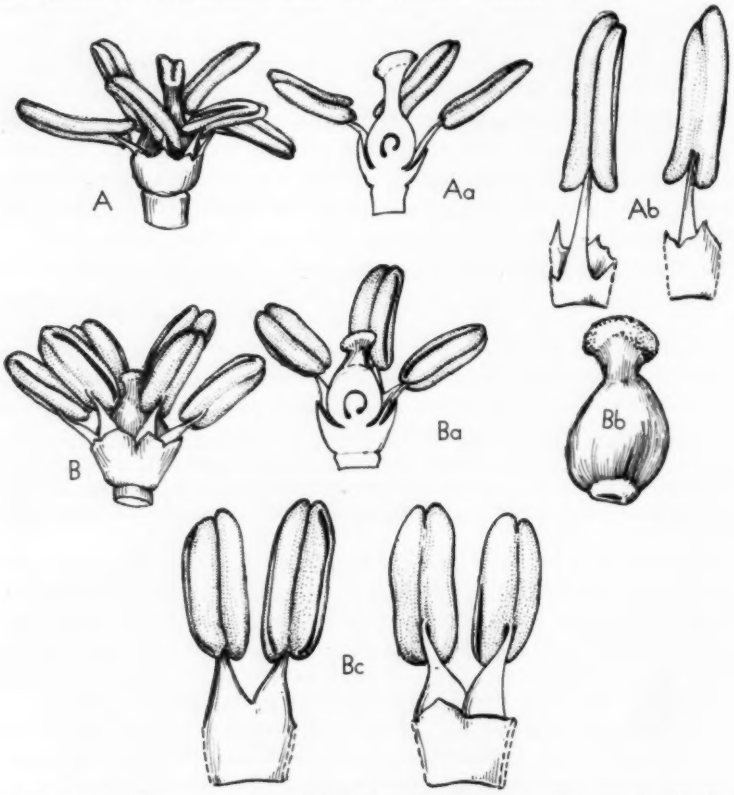
COCCOTHRINAX, Sarg. in Bot. Gaz. xxvii, 87 (1899). SEAMBERRY PALMS.

Stamens 8–13, commonly 9: fruit purple or blackish at fresh maturity; exterior of mature seed prominently sulcate or furrowed as if it were to be divided into parts, the grooves straight (rectisulcate) or branching, curved and devious (mistisulcate), extending like cracks into the albumen and often to the center of it.

The botanical collector finds the leaves of fan palms difficult to prepare for the herbarium. For relief he may take small or supple leaves from young sterile trees, and thereby he obscures the problem. Such immature foliage is likely to be green on both surfaces whereas mature leaves from bearing trees of the same species may be silvery and perhaps pubescent underneath; and the hastula and petiole take on their full character.

The sulcation of the seeds is by no means uniform in all the species of Coccothrinax. In the single species to which we agree to apply the name *C. argentea* the sulci or furrows are nearly or quite straight from top to near the base without anastomosing or curving connections and usually five or six of them extend directly into the albumen and frequently to the

center of it. This rectisulcate structure is shown in Fig. 10. The straight sulci are depicted by Martius in 1838 in the first picture of the seeds of the species, and this evidence may be accepted as validation of the name *argentea*. This fragmentation is to be contrasted with the mistisulcate pattern seen in the other pictures printed in the present text. Differentiation of the particular sulcation in the species has not been attempted until the present venture, although it is shown to some extent by Sargent in his Silva in 1902 and by Beccari in Palms of Cuba in 1913. Perhaps we may now have a clue to unnoticed specific differences, and they may be given a significance I do not at present foresee. It may be difficult ever to verify the species of Coccothrinax that were founded without fruits.



8. FLOWERS IN THRINAX, ×8 and details ×15. A, *Thrinax parviflora*, Aa, longitudinal section, Ab, stamens. B, *Thrinax microcarpa*, Ba, longitudinal section, Bb, pistil, Bc, stamens. Cuba; Marquesas island, Florida keys.

A. Flowers and fruits sessile; seeds rectisulcate at maturity, often splitting: leaves silvery and pubescent underneath: dry fruit 8 mm. thick. . . 1. *C. argentea*

AA. Flowers and fruits pedicellate; seeds (not known in no. 2) variously mistisulcate.

B. Pedicels very short to nearly wanting, 1–1.5 mm. long. . . . . 2. *C. Eggersiana* and var. *sanctæ-crucis*

BB. Pedicels conspicuous and unmistakable, usually 2 mm. or more long.

C. Fruits and seeds very large, the latter commonly 7–8–9 mm. thick at dry maturity.

D. Dry mature seeds markedly cerebriform or brain-like in configuration (Fig. 13), and depressed end to end, broader than long: hastula of mature leaf broader than high and incurved on upper margin, 4 cm. wide; leaves very silvery underneath. . 3. *C. martinicaensis*

DD. Dry mature seeds not cerebriform, the sulci not rigidly straight, more or less curved but not much branched nor interlocked: hastula smaller and not incurved even though perhaps cupular.

E. Seed at dry maturity depressed, clearly broader than high: hastula about 2 cm. wide. . . . . 4. *C. discreta*

EE. Seed not depressed, at least as high as broad and commonly longer.

F. Leaves not silvery underneath at fresh maturity. . . 5. *C. sancti-thomæ*

FF. Leaves argentate or silvery underneath when full grown. . . . . 6. *C. Dussiana*

CC. Fruits and seeds small to medium, the latter 5–6–7 mm. across at dry maturity.

D. Seed not depressed, at least as high as broad: hastula very broad. . . . . 7. *C. sabana*

DD. Seed depressed lengthwise when mature and dry, broader than long: hastula narrow except in no. 9.

E. Full-grown leaves not silvery underneath, and glabrous. . . . 8. *C. Boxii*

EE. Full-grown leaves very silvery underneath and hairy-pubescent under a strong lens.

F. Sulci or furrows on seed much branched on surface, extending to center of albumen. . . . . 9. *C. australis*

FF. Sulci simple, not extending to center. . . . . 10. *C. alta*

1. **Coccothrinax argentea,** Sarg. Silva N. Amer. xiv, 85 (1902). Figs. 9, 10.

Thrinax argentea, Lodd. ex Schult. & Schult. in L. Syst. Veg. vii, pt. ii, 1300 (1830); Mart. Hist. Nat. Palm. iii, 256, t. 103 fig. iii (1838). There is confusion as to the citation for the combination.

Coccothrinax argentea. Thus Beccari in 1907 (Webbia, ii, 317) cites Sargent in Bot. Gaz., 1899 (xxvii, 89) as authority and he is followed in quotation by Dahlgren, Index of American Palms, and by others, but although Sargent states that the old *Thrinax argentea* is a Coccothrinax he does not put the names together as is required by contemporaneous practice, inasmuch as other names may be involved.

Described in Gentes Herbarum, iv, 251 (1939). Attributed to Lesser islands but I have seen no indubitable specimens from them.

2. **Coccothrinax Eggersiana,** Becc. in Webbia, ii, 321 (1907).

Tall palm, to 6 m.: leaves apparently numerously segmented; segments 4–5 cm. broad at base, lacking secondary ribs or with only 1 either side next the margin, parallel veins many and inconspicuous, upper surface green and dull, under surface thinly pubescent and gray-whitish; petiole 6 mm. broad: spadix large, each inflorescence emerging from a short-pointed secondary spathe and simply paniculately branched; flowers white, with 9 stamens, on very brief pedicels about 2 mm. long or quasi-sessile, perianth with triangular teeth, filaments double the length of the teeth, anthers 1 mm. long, ovary globose-ovate: fruit not seen.

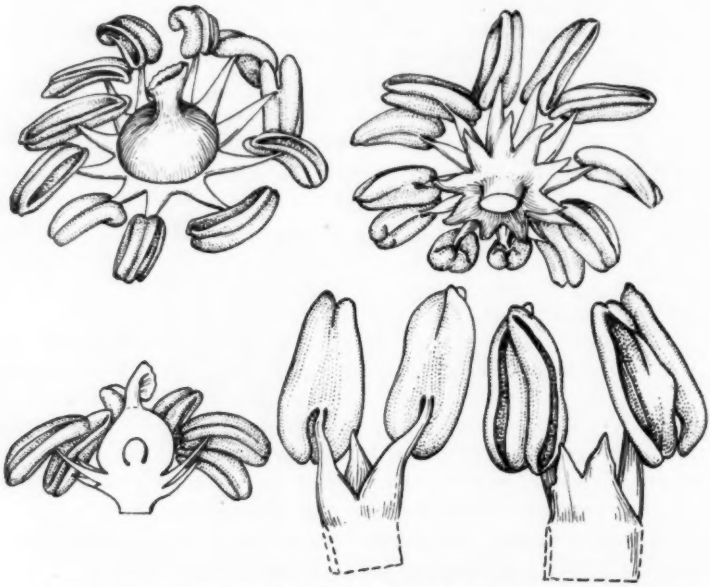
Island of St. John, American Virgins, an incomplete Copenhagen specimen seen by Beccari, collected on King's Hill by *Eggers 3117* in 1887.

The Copenhagen specimen shows part of a leaf, partial hastula, one inflorescence or spathelet, flowers in final stages with stamens mostly fallen. The species is yet to be verified.

C. Eggersiana var. **sanctæ-crucis,** Becc. op. cit. 323.

Distinguished from the species, according to Beccari, by longer pedicels, more deeply divided perianth with teeth long-triangular, filaments shorter, anthers longer, ovary with longer apex.

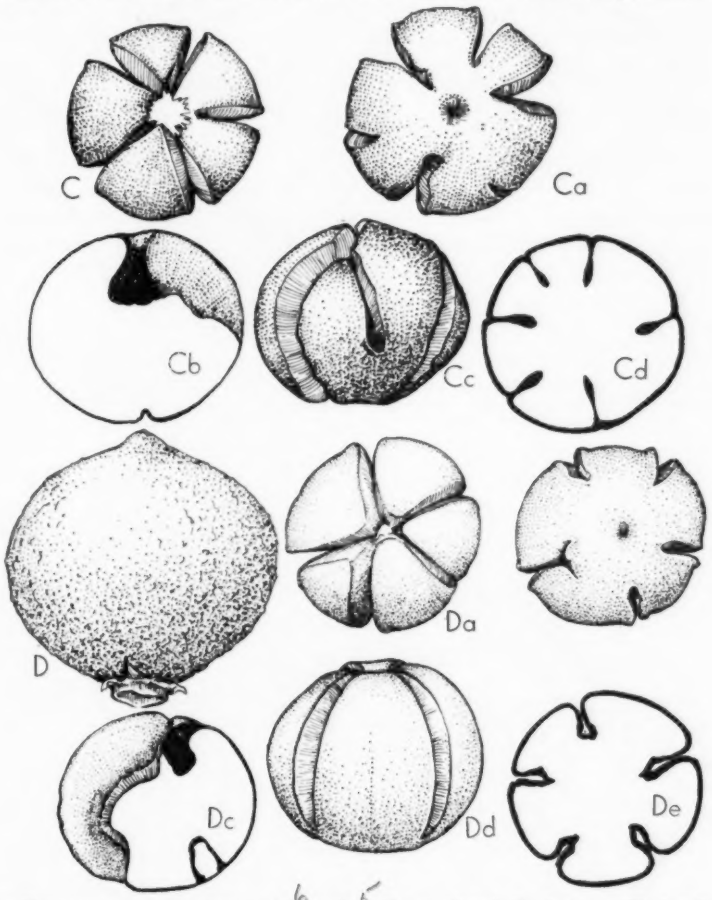
St. Croix, American Virgins, collected *Alfred Benzon,* specimen in Copenhagen.



9. COCCOTHRINAX ARGENTEA from Haiti, × about 8, stamens at lower right ×12.

3. **Coccothrinax martinicaensis,** Becc. in Webbia, ii, 324 (1907). Figs. 11, 12, 13, 14.

Erect straight palm to 8 m. tall, with single trunk rather stout for the genus and which when young is closely invested with compact woven fiber covering the petiole-bases; coma or leaf-head nearly close or compact rather than loosely diffuse or open, usually only one or two of the lower leaves long-swinging, most of the leaf-segments on mature trees hanging from about the middle or less: leaves 1 m. and more broad with prominent



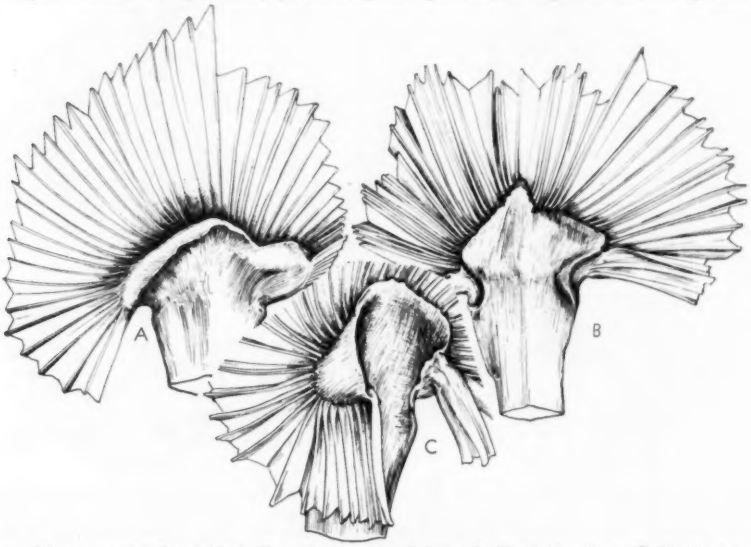
10. COCCOTHRINAX ARGENTEA, × ½ and ¼. C, top of seed, Ca, bottom, Cb, longitudinal section, Cc, side, Cd, cross-section, all from Haiti. D, fruit side view, Da, top and bottom view of seed, De, longitudinal section, Dd, side, De, cross-section, all from Santo Domingo.

wide palman, green on upper face, very silvery underneath, glabrous, cut to two-thirds or more its depth; segments 2–4 or even 6 cm. broad at widest part, with 1 or 2 prominent ribs either side the midrib and many intermediate delicate ones under the lens, the apex long and narrow and deeply split; petiole long and stout, nearly flat in section, about 1.5 cm. broad at widest part; hastula a stout elevated expanded woody obtuse ridge standing 5–10 mm. high and usually 4 cm. across base of blade: spadix large and declined by a stout peduncle, to 4 dm. long and 1–2 dm. broad, closely laden when in fruit, with stout divaricate pedicels 3–5 mm. long, spathes with apices 4–5 cm. long: fruit shining black, oblate, 1 cm. or more across but less in height, with thin unmarked pulp; seed 8–9 mm. across, flattened lengthwise, with irregular periphery, sulcate with 4 or 5 main shallow not strict more or less wavy furrows that anastomose at bottom and top giving it a cerebriform or brain-like appearance, the albumen divided by 10 and more deep intrusions that usually do not meet at the center.

Martiní-ca ensis, named for the island of Martinique, *La Martinica* in Italian, seen by Odoardo Beccari (Florence, Italy) in Herb. de Candolle; Berlin, *Hahn 1531* collected in Vallee de St. Pierre (1873), and specimens also in Berlin by Père Duss. Collected by *Bailey 289* near Fort-de-France, Martinique, both in the wild and in plantations, an attractive tree.

† 4. **Coccothrinax discreta,** spec. nov. Figs. 11, 15, 16, 17.

Arbor gracilis altaque ad 15 m.: folia 1 m. lata, viridia supra, argentea glabraque subter, segmenta 3–4 cm. lata, venæ laterales desunt, venulæ parallelæ multæ; hastula suberecta, tubularis vel cupularis, 1–2 cm. super folium vel palman; petiolus pæne planus, 1–1.5 cm. latus: spadix

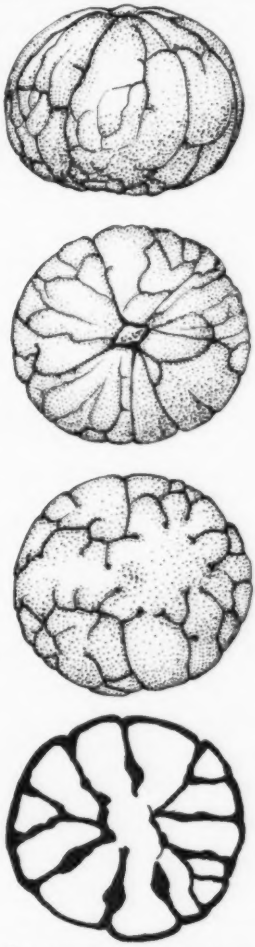


11. HASTULAS × about ½. A, *Coccothrinax martinicaensis*; B, *C. Dussiana*; C, *C. discreta.*

magnus, spathellæ breves acutæque, inflorescentiæ 5–6 dm. longæ, divaricate ramosæ, pedicelli 3–4 mm. longi; flores fere 9 staminibus vix stigma excedentibus, antheræ longiores quam filamenta et bis longiores quam latæ: fructus circa 1 cm. diam., breviacuminati; semen magnum, 7–8 mm. diam., depressum, sulci tenues et pæne simplicia, leviter curvi, non ad centrum albuminis extendentes.

Slender tree to 15 m. tall, trunk erect but often curved or indirect, coma open with long petioles and leaf-segments not hanging: leaves 1 m.

12. COCCOTHRINAX MARTINICAENSIS, trunk below the leaf-head not yet denuded of its shag of petiole-bases.

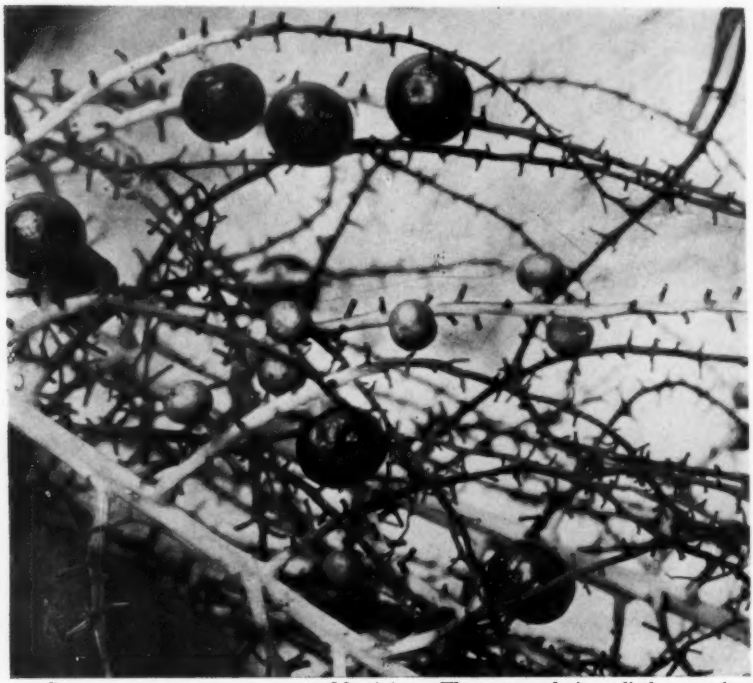


13. COCCOTHRINAX MARTINICAENSIS × 4. Side view of seed, bottom, top, cross-section, top to bottom respectively.

or more broad, green on upper face, glabrous and silvery underneath, segments about 3 cm. broad toward base, not very deeply divided, lateral ribs wanting but parallel veinlets many and fine; hastula a short tubular or somewhat cupular striate protuberance, standing 1 cm. and more above the blade, the apex obtuse, rim not expansive; petiole nearly flat, 1–1.5 cm. broad, margins smooth and almost sharp: spadix ample with short sharp-pointed spathelets, inflorescences 5–6 dm. long and strongly simply divaricately branched, pedicels 3–4 mm. long and medium stout; flowers with usually 9 stamens widely spreading, anthers about twice as long as broad and exceeding the filaments in length, not much overtopping the stigma: fruit nearly or quite 1 cm. thick with uniform or only slightly wrinkled surface and very short point; seed large, somewhat depressed, 7–8 mm. thick, broader than high, with light thin nearly simple slightly curved sulcations that do not extend to center of albumen.

Island of Vieques on uplands and hills, *Bailey 671* near Isabel Segunda; *Shafer 2610* Isabel Segunda to Santa Maria. An attractive comely palm on good land, but sometimes remaining as lone sentry trees on windswept shores.

Differs from *C. alta* of adjacent Puerto Rico in its more silvery under surface of leaves, more upstanding and more tubular hastula, larger seeds (7–8 rather than 5 mm. broad).



14. COCCOTHRINAX MARTINICAENSIS, Martinique. The mature fruits a little over-size.

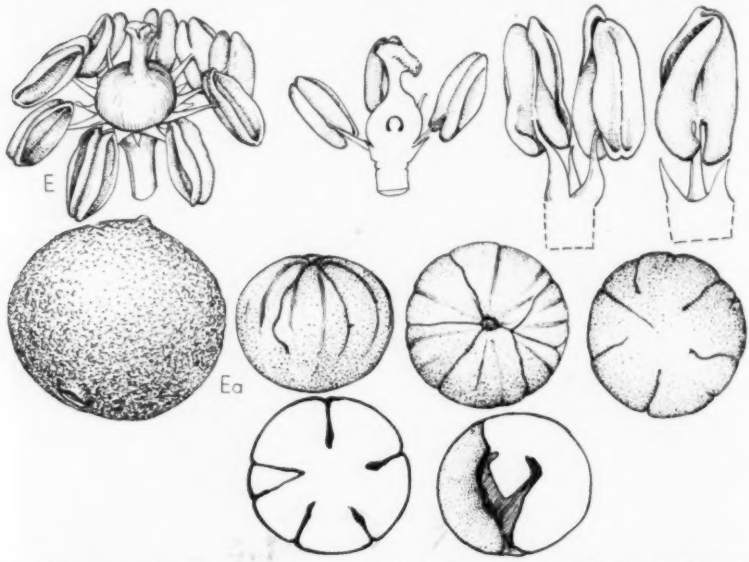
5. **Coccothrinax sancti-thomæ,** Becc. in Webbia, ii, 303 (1907). TYRE PALM. Figs. 18, 19.

Very slender broom palm to 8 m. tall, trunk solitary but tree often growing in loose or open colonies, trunk covered with abundant shag: leaves about 1 m. across, green on both surfaces but with light silver sheen

15. COCCOTHRINAX DISCRETA on Vieques island. Note the spindling curved trunks as compared with the rigidly erect trunk in Fig. 20.

on under side when fresh and not glaucous (more silvery on herbarium sheet), in horizontal or ascending position on tree and most of the long-pointed segments standing straight out rather than hanging, conspicuous side-veins absent, the segments 2–3 cm. broad near base; hastula small, straight across the top or with a short point in its middle and about 2 cm.

16. COCCOTHRINAX DISCRETA, two remaining trees on a wind-blown coast; note the slenderness of the trunks. Sea in the distance; Vieques.



17. COCCOTHRINAX DISCRETA. E, flowers × about 8, stamens ×12; Ea, fruit and seeds ×3, showing seeds side, top, bottom views, cross and longitudinal sections.

across; petiole very slender, sharp-edged: spadix large, 2–3-branched, with flattened rachis and many closely placed stout right-angled branches 8–12 cm. long, pedicels stout and short but evident and 1–2 mm. long: fruit flattened endwise, 8–9 mm. across when dry; seed also flattened endwise, about 6 mm. across, circular outline irregular, bearing several simple or forked and with intermediate lines, the appearance described by Beccari as "cerebriform" (brain-shape, of irregular depressed pattern), main sulci or furrows extending to center of albumen.

St. Thomas, American Virgin islands, collected in 1905–1906 by Boergsen and seen by Beccari in herbarium of Copenhagen: Water island, *Britton & Marble 146* (1913); hills, *Bailey 191* (1938); Smith's Bay on dry slopes and valleys, *Bailey 608* (1949); planted from the wild, Charlotte Amalie, *Bailey 607* (1949).

† 6. **Coccothrinax Dussiana,** nom. nov. Figs. 11, 20, 21.

Thrinax barbadensis, Duss, Fl. Phan. Antilles Franc. 486 (1897).

Coccothrinax barbadensis, Becc. in Webbia, ii, 328 (1907).

For discussion of the name *barbadensis,* see page 98.

Erect strong tree to 15 or 16 m. tall, trunk solitary and 14–18 cm. diameter: leaves large, green on upper face, silvery and thinly pubescent underneath, divided to two-thirds depth of blade, lateral veins many and very thin, secondary ribs usually none, segments 3–4.5 cm. broad at base,

18. COCCOTHRINAX SANCTI-THOMÆ on St. Thomas island; characteristic head or coma.

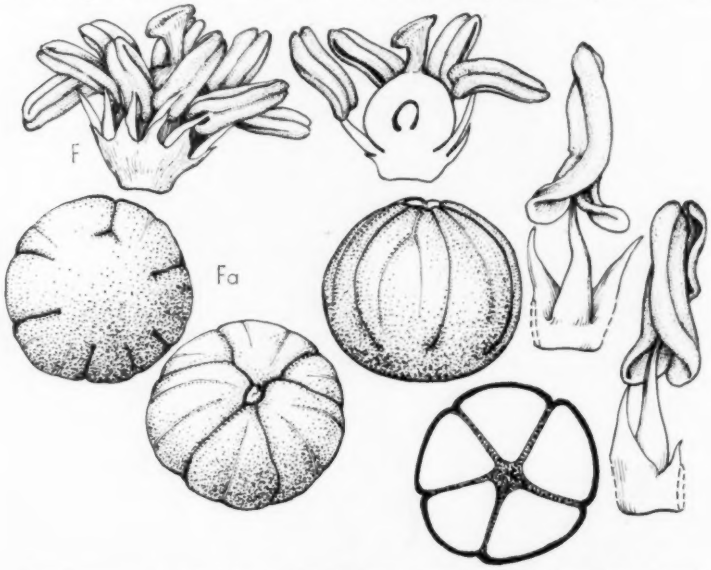
apices very long and slender; hastula triangular and pointed in middle, 3–4 cm. broad; petiole sharp-edged, to 2 cm. broad, obtusely elevated on both surfaces: spadix large, to 4 dm. long, the separate inflorescences several and stoutly side-branched, these ultimate rachillæ 9–12 cm. long and very stout, pedicels thick and 3–4 cm. long; spathelets not extending much beyond the peduncles; flowers with 9–12 stamens, the filaments short and broad: fruit 7–9 mm. thick when mature and dry; seed not noticeably depressed, 7–8 mm. thick both ways, bearing several irregular weak not anastomosing sulci that do not extend to center of albumen.

Guadeloupe; reported by Père Duss on dry and calcareous hills at Morne-a-l'Eau, Gozier, Marie-Galante, la Désirade, and elsewhere. Hillside at Morne-a-l'Eau, *Bailey 15*.

Beccari based his *Coccothrinax barbadensis* on Guadeloupe *Père Duss 3797*. I have not seen this number, but I have examined his 3798 and his 4676 in the herbarium of the New York Botanical Garden, both of them in fruit. In these Duss specimens the leaves are only juveniles that could be mounted entire on sheets, and therefore mature hastulas are not in evidence.

† 7. **Coccothrinax sabana,** spec. nov. Figs. 4 (frontispiece), 22, 23.

Palma erecta validaque, trunco solitario 6 m. vel plus alto: folia 1 m. lata, viridia supra, pubescentia argenteaque subter, nervi secundarii nulli vel paucissimi, venæ multæ et indistinctæ; hastula 4–6 cm. lata,



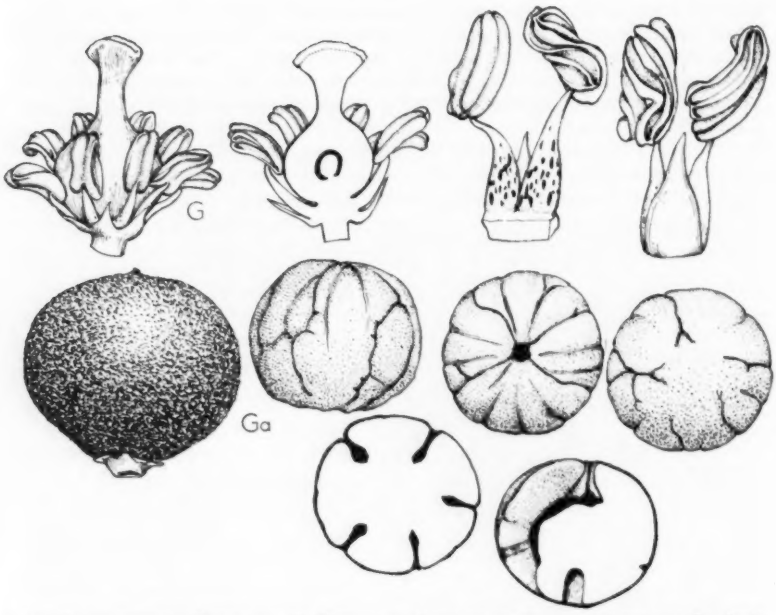
19. COCCOTHRINAX SANCTI-THOMÆ, ×6. F, flower complete and in longitudinal section; Fa, seeds bottom and side views and top view below, cross-section, right stamens × about 8. Seed less depressed than usual.

elevata, margo irregularis vel acutus medio: spadix magnus, pinnate ramosus, inflorescentiæ 3–4 dm. longæ et laxis chartaceisque spathillis subtentæ; pedicelli validi, 3–5 mm. longi: fructus magni, oblati, 8–9 mm. lati cum sicci; semen pæne globulare, 6–7 mm. diam., mistisulcatum, 6 vel pluribus suturis aduncis, superficies aliquid cerebriformis, embryon basale.

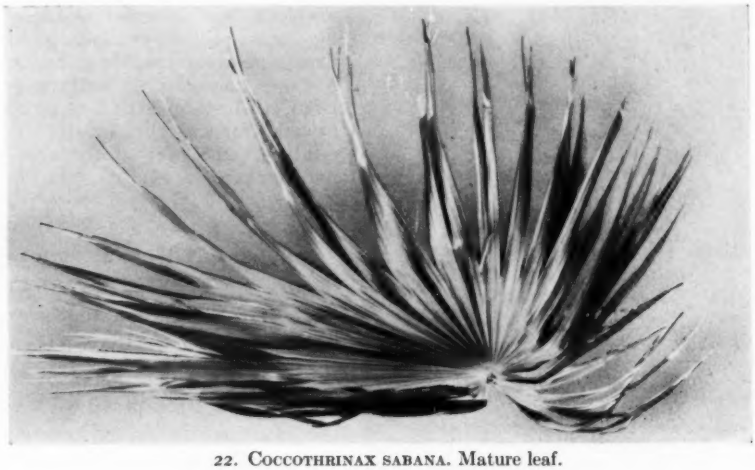
Erect strict palm with solitary shaggy and denuding strong trunk to 6 m. or more tall: leaves about 1 m. across, deeply segmented and the segments conspicuously hanging prone and 3–4 cm. broad toward their base, terminal points very narrow and long, upper surface of leaf green and many-striate but mostly without conspicuous lateral or secondary ribs, often prominently cross-hatched, under surface minutely pubescent and markedly argentate or silvery; hastula 4–6 cm. broad, upstanding above the base of the blade, irregular and medianly pointed on its upper margin; petiole slender, 1.5–2 cm. broad, edges more or less rough or erose, center obtusely elevated: spadix large and abundantly and closely pinnately branched, the separate inflorescences 3–4 dm. long and subtended by short loose papery sheaths or spathelets; pedicels prominent, thick and stout, 3–5 mm. long: fruit (dry) large, more or less flattened endwise, 8–9 mm. across, surface even or roughish; seed nearly globular, 6–7 mm. thick, sulcate and somewhat cerebriform with 6 or more crooked furrows that mostly extend to the center of the albumen, embryo basal.

20. Coccothrinax Dussiana with straight stout trunk. Guadeloupe.

Island of Saba, Netherlands West Indies, wild in the crater basin about the town of Bottom and often appearing in places where seeds may have been scattered by human agencies or young trees transplanted, but the plant reputedly indigenous, *Bailey 406*.



21. COCCOTHRINAX DUSSIANA. G, flowers × about 10, stamens × about 20; Ga, fruit × about 4, and seeds in side, top, bottom views, cross and longitudinal sections.



22. COCCOTHRINAX SABANA. Mature leaf.

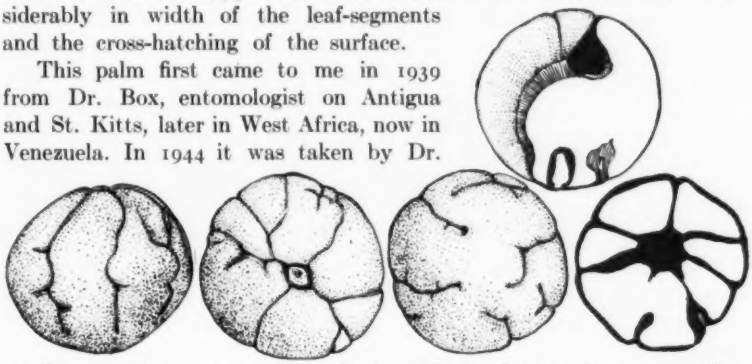
† 8. **Coccothrinax Boxii,** spec. nov. Figs. 24, 25.

Arbor gracilis erectaque ad 24 m. alta, truncus solitarius, 7–10 cm. diam.: folia 10–15, palmata, 1 m. lata, viridia nitidaque supra, subter argentea glabraque, petiolus inermis, 1 m. vel plus longus, 1–1.5 cm. latus, hastula pæne plana, triangulariacuminata, circa 2 cm. alta, segmenta 2–3 cm. vel minus lata, venæ laterales inconspicuæ: spadix 6–7 dm. longus, fasciculi 5 vel 6, glabri, 10–16 cm. longi, simplices, rachillæ circa 1 mm. crassæ; pedicelli circa 2–3 mm. longi: fructus globulares vel aliquid truncati, 8–10 mm. diam. cum sicci, superficies non corrugata; semen 6–7 mm. diam. et 1 mm. minus altitudine, plus vel minus truncatum, mistisulcatum sed vix cerebriforme.

Tall slender erect tree with single not tumid trunk that is 7–10 cm. diameter, to 24 m. tall: leaves 10–15, long-petioled, mostly ascending or horizontal or only the old basal ones hanging, 1 m. broad, green and glossy on upper surface, silvery and glabrous underneath, more or less marked by cross-elevations on both surfaces, segments narrow, about 2–3 cm. or less broad, side-veins inconspicuous, petiole 1 m. or more long and 1–1.5 cm. broad, rather abruptly thin-edged, the base covered in a closely woven mesh; hastula flattish, about 2 cm. high to triangular point: spadix intrafoliar, about 6–7 cm. long and bearing 5–6 short simply branched glabrous clusters 10–16 cm. long with one short continuous rachis, rachillæ about 1 mm. thick when dry; spathelets 10 cm. or less long, broad but narrowed to a point, the blade appressed to the main axis; pedicels 1–3 mm. (usually 2 mm.) long; flowers not seen: fruit globular or somewhat flattened lengthwise, probably purplish, 8–9 or 10 mm. thick when dry and surface hardly roughened, but minutely pimpellate; seed 6–7 mm. thick, the irregular curved divisions strongly marked on the dry surface, not extending to center of albumen which does not split into parts, hardly cerebriform, embryo basal.

Barbuda island, near island of Antigua in British Leeward West Indies, in high xerophytic country usually on limestone rocks, at full growth conspicuous for its tall slender trunk crowned with a few fan-shaped leaves, *Harold E. Box 669* (type), *John Beard 388*, *L. R. Hutson*. It varies considerably in width of the leaf-segments and the cross-hatching of the surface.

This palm first came to me in 1939 from Dr. Box, entomologist on Antigua and St. Kitts, later in West Africa, now in Venezuela. In 1944 it was taken by Dr.



23. COCCOTHRINAX SABANA seeds, × about 4. Side, top, bottom views, cross-section, longitudinal section.

Beard, forester then assigned to British West Indies, now in South Africa. In 1947 it was collected, at my request, by Dr. Hutson, then veterinarian in charge of the agricultural work on Antigua, now returned to his native island, Barbados.

I distinguish this broom palm by its flat rather than declined foliage, leaves green and nitid on upper face and only lightly silvery underneath with narrow segments that do not abjectly hang, very closely woven webs at base of petioles on trunk, conspicuous pedicels.

Contrasts

C. Boxii. Leaf-segments narrow, 3 cm. or less broad at middle, upper surface glossy when fresh and usually marked with short irregular cross-lines, under surface uniformly silvery, tips long and very narrow; hastula with irregular broken margin, the sides not greatly inrolled and central point not upstanding: spathelets (floral sheaths) short and narrow and commonly sharp-pointed, protruding part 10–12 cm. or less long; pedicels thick and stout, about 1 mm. diam.: fruit when dry 8–9 mm. transverse diam. but variable in size; seed gray, with marked deep grooves, proceeding directly from base.

C. australis. Leaf-segments 4 cm. or more broad at middle, not glossy above or cross-marked, under surface whitish and more or less flecked and pubescent tips not long-acuminate; hastula large with upstanding center and strongly rolled sides: spathelets (floral sheaths) broad and long and not attenuately acute; pedicels slender, about .5 mm. thick when dry: fruit when dry 6–8 mm. transverse diam. and mostly uniform in size; seed brown, with weak thin more or less indirect branched or wavy white lines base to apex.

9. **Coccothrinax australis,** Bailey, Gent. Herb. vii, 365 (1947). Fig. 26.

Abundant on coastal highlands, banks and cliffs, Trinidad, Tobago, Little Tobago.

10. **Coccothrinax alta,** Becc. in Webbia, ii, 331 (1907). Fig. 27.

Thrincoma alta, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 540 (1901).

Described in Gentes Herbarum, iv, 256 (1939). Apparently on Water island in St. Thomas group (and Puerto Rico).

It is customary to refer Cook's *Thringis laxa* and *T. latifrons* to *Coccothrinax alta,* but these names were based on such inadequate material that identification is practically impossible.

2. ROYAL PALMS: ROYSTONEA—NEW ENUMERATION

The earliest post-Linnæan botanical treatment of the royal palms is by Nicolaus J. Jacquin in 1763 in his account of *Areca oleracea* of the Carib

Islands. The specific name *oleracea* refers to the oleraceous or edible nature of the "cabbage" or great terminal bud capping the trunk. The generic name *Areca* is a Linnæan title of palms in Asia, typified by *Areca Cathecu* (to this day misspelled *Catechu*), the betel-nut of India and now widely spread in the western tropics; true Areca is not native in the Occident.

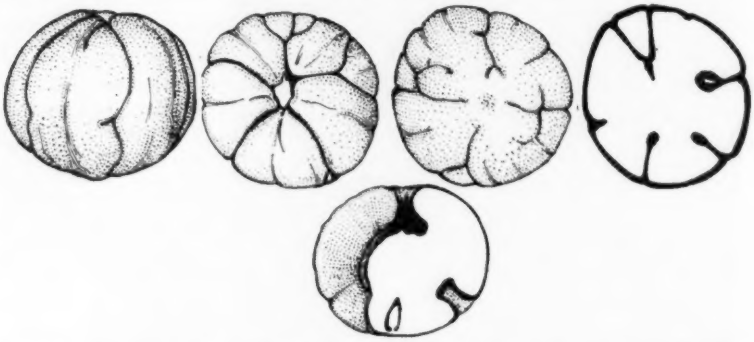
24. Coccothrinax Boxii on Barbuda.

Next event is the founding of the genus Euterpe by Joseph Gaertner in 1788, applied to the manac tribe of palms, into which some of the royals were thrown and one of which is at last transferred in this paper; Euterpe we are to discuss more fully in a subsequent contribution.

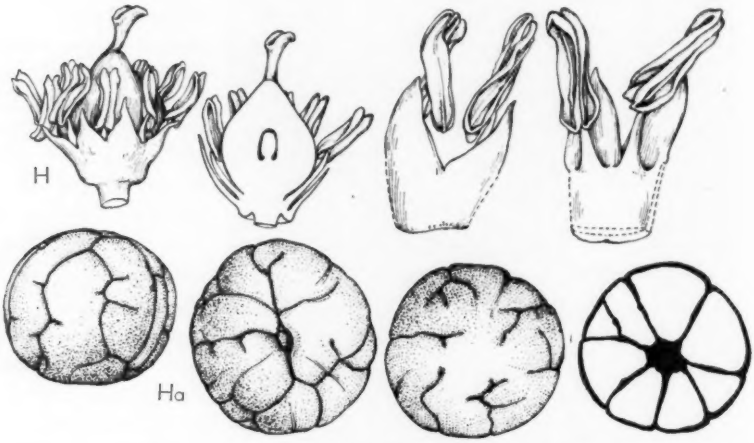
Third event is the making of the genus Oreodoxa by Willdenow in 1804, and to this name all the known species of royal palms were unhesitatingly referred for more than sixty years; two species of Oreodoxa were established by Willdenow from mountain regions of Venezuela (the word Oreodoxa means "glory of the mountains," and can hardly accommodate the royals of middle

lands and swamps). It is now commonly agreed that Willdenow's Oreodoxa applies to one or more of the manacs.

We now come to contemporaneous time. In studying the royals and manacs of Puerto Rico, O. F. Cook broke completely with the past and in 1900 established the new genus Roystonea (General Roy Stone, 1836–1905), to which he admitted three species, *Roystonea oleracea*, *R. regia* and *R. borinquena*, and a year later added *R. floridana*. In 1912 Beccari, the Italian, wrote on the Palms of Cuba, and discarded Roystonea and substi-



25. Coccothrinax Boxii, seeds × about 4. Side view, top view, bottom, cross-section, longitudinal below.



26. Coccothrinax australis. H, flowers and stamens × about 5. Ha, seeds, side, top, bottom, cross-section, × about 4.

tuted Oreodoxa of Kunth rather than of Willdenow, a practice not tenable under International Rules of Nomenclature. Burret of Berlin in 1929 accepted Cook's treatment and transferred to Roystonea the *Euterpe Jenmanii* of C. H. Wright and *Oreodoxa princeps* of Beccari. In 1935 Bailey accepted the treatments of Cook and Burret and founded *Roystonea jamaicana* and subsequently (1939) added *R. hispaniolana*. In 1939 Cook split Roystonea, taking out a genus Gorgasia for the Barbadian and Trinidadian royals, which he considered to be two separate species; this proposed new genus seemed to Cook "appropriate, to commemorate the achievement of Dr. William Crawford Gorgas in establishing the system of sanitation against yellow fever and malaria" in the Canal Zone. In 1943 León published on the royal palms of Cuba and made three new species, *R. lenis*, *R. violacea*, *R. stellata*, while retaining also the common *R. regia* of that island. In the meantime, the new treatment of Cook as to Roystonea had been accepted by Britton in his Botany of Porto Rico and the Virgin Islands, 1923, although earlier discarded by Urban in his Flora Portoricensis, 1903.

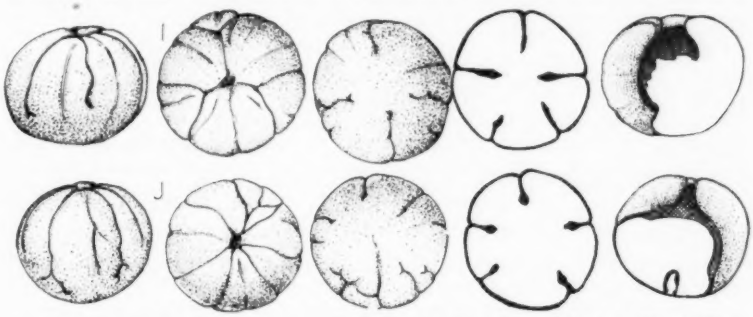
This brings us to the present review of the noble royal palms.

ROYSTONEA, O. F. Cook, in Science, ser. ii, xli, 479 in note (1900); Bull. Torr. Bot. Club, xxviii, 549 (1901), and xxxi, 349 (1904). Royal Palms.

Gorgasia, O. F. Cook, in Nat. Hort. Mag. xviii, 112 (1939).

Oreodoxa, Auth. not Willd.

Tall columnar single-trunked monœcious-flowered pinnate-leaved unarmed trees making a head or coma of foliage above a true crownshaft and at the base of the shaft bearing branching spadices that issue from a long projecting 2-valved spathe, the outer shorter valve soon falling and



27. Coccothrinax alta, seeds × 3. Upper row, I, from Coamo Springs, Puerto Rico. Lower row, J, from Water island. Side view, top view, bottom, cross-section, longitudinal section.

the long expanded inner valve often conspicuously hanging even after the fruits have matured; bole often markedly swollen or tumid at some part of its length: fruit a small berry-like body less than 2 cm. in either diameter, mostly nearly equal in breadth and length but in one or two species about twice as long as broad; seed single (2 carpels having aborted) with solid even though sometimes oily homogeneous albumen holding embryo near its base, with lacerated raphe on the face: flowers normally in 3's at each placement on the rachilla, a pistillate flanked by 2 staminate, stamens 6 but varying to 7 or 8, anthers versatile and at anthesis exceeding the valvate sepals; staminate flower containing a spherical or ovoid pistillode.

Notable trees, often majestic and reaching more than 100 feet, with marble-like or monolith-like solitary bole, known as single separate sentinels although making open forests in the wild but not in multiple clumps, continental southern Florida through the West Indies islands to eastern Venezuela. These trees are much planted through the tropics with no record of their sources or species. The dozen known species are distinct enough in their natural habitats but plantings look to be endlessly confused in parks, about buildings, recreation grounds, and on estates. We do not know whether the variations are induced by food supply, moisture and exposure, or whether there may be hybrids. First approach to the question should be a closer taxonomic study, with ample museum materials; perhaps there are more clear species than we suppose, as indicated under *R. peregrina*. Apparently there are no reliable chromosome records; or if records exist one should insist on seeing preserved specimens of foliage, flowers and fruits together with significant photographs before accepting the determinations. Genetic study may sometime be undertaken, but it must be a major program necessarily extending over many years or even across human generations under the most careful technical controls, and with a developed basis of experience. I suspect there are more species than we have recognized.

The Roystoneas or royal palms are noble trees in common cultivation, but planters and nurserymen have not been taught the differences between them and they are grown without much discrimination as to kinds. Good horticultural observations of them would probably be able keenly to supplement the required taxonomic studies.

In hotel yards and in parks we may not be able to determine all the bearing trees of royals. This is probably because we do not yet know all the native species. It is easy enough to call them hybrids, but we do not know that they hybridize or what would be the progeny if they did. The islands in the West Indies chain have been settled for centuries and we cannot discover what has been transported from one to another, nor what species of royals may have originally inhabited them or may still be native

in the remote parts. Recently I visited the Greencastle district on the island of Antigua and saw in high valleys good stands of what I took to be *Roystonea oleracea* of faraway Trinidad and Barbados, and I wondered; then I met there an old resident who told me he had himself introduced seeds of royals from Trinidad and had grown trees on his place in the hills, and from these trees he had seen the clumps arise in many places down the valleys. I no longer attempt to name all the royals in plantations: they may have come from dozens of sources. Nurserymen grow the trees only in their young stage, and usually cannot distinguish.

Unfortunately, we do not yet know how to distinguish all the royals in the young state, although the late O. F. Cook made a beginning on this problem in National Horticultural Magazine for April, 1939, and in Science for June 14, 1935.

A. *Species confirmatæ*

Species well enough known to be satisfactorily diagnosed, with large fruits usually flattened on one side (exception in no. 10) toward base, and shrivelling in drying. For AA, see page 129.

Series 1. UNISERIATI. Pinnæ on full-grown leaves in a single row or series or plane on either side the rachis: spadix nearly or quite glabrous or soon becoming so, 2–3-ramose, rachillæ strongly undulate or crooked in the spathe and more or less retaining this character at maturity when released by the splitting of the spathe: fruit oblong, 18–20 cm. long and about one-half as thick, flat or straight on inner edge and outwardly curved at base: majestic columnar trees, bole more or less enlarged at base but little if at all tumid above; coma or leaf-crown mostly not drooping to cover the fruit-clusters, usually horizontal at base at maturity when standing separately or alone. Trinidad, Barbados.....1. *R. oleracea*

Series 2. PLURISERIATI. Pinnæ on full-grown leaves in two or more planes or lines either side the rachis: fruit little if any longer than broad, curving or rounded about equally on all sides, in only a few species angustate at base: coma or leaf-crown with drooping basal leaves; bole usually tumid or ventricose.

A. Rachillæ (ultimate branchlets of spadix) very slender, little if any more than 1 mm. thick when dry, hanging or very diffuse when in bloom, mostly not undulate.

B. Micropyle on mature fruit marked or subtended prominently with 6 short or stellate elevations and many radiating lines. Cuba.....2. *R. stellata*

BB. Micropyle area plane, not subtended. Bogs, Jamaica.....3. *R. princeps*

AA. Rachillæ much thicker and stouter, erect or divaricate with reference to axis of spadix.

B. These rachillæ habitually strongly undulate or wavy in the spathe-valve and usually also afterward, this shape a conspicuous feature in most cases.

C. Rachis of leaf bearing many stipule-like filaments up to 16 cm. long; leaves shining. Cuba.....4. *R. lenis*

CC. Rachis devoid of filaments; leaves not shining on upper face, cinereous underneath. Venezuela.....5. *R. venezuelana*

BB. These rachillæ mostly straight or only curved, not characteristically wavy or undulate (partial exception sometimes in no. 7).

C. Flowers (envelopes and stamens) violet: wood of trunk rubescent. Cuba.....6. *R. violacea*

CC. Flowers green or stramineous (anthers sometimes purplish in no. 11).
D. Mature fruit attenuate to bottom, base attenuate, acute and more or less projecting when dry. Jamaica.....7. *R. jamaicana*
DD. Mature fruit obtuse or thick at base, not much if any narrowed, blocky in general shape.
E. Blossoms densely placed on rachillæ, usually touching or even crowding each other; spadix lepidose-pubescent.
F. Leaves glossy on upper face: fruit narrowed to base. Puerto Rico.....8. *R. borinquena*
FF. Leaves not glossy on upper face: fruit not narrowed to base. Hispaniola.....9. *R. hispaniolana*
EE. Blossoms separately or not contiguously placed on rachillæ, mostly scattered; spadix glabrous, perhaps glaucous.
F. Dry mature fruit large, about 15 mm. long and nearly as broad, squarish, not flat-sided or tapered to base. Guadeloupe and other islands.....10. *R. peregrina*
FF. Dry mature fruit quite otherwise, short-oblong to nearly globular.
G. Pinnæ indifferently or not at all nerved lengthwise either side the midrib: spadix long and loose: fruit practically globular, about 10 mm. thick and 11–12 long. Lowlands and swamps, Florida.....11. *R. elata*
GG. Pinnæ stoutly nerved lengthwise either side the midrib: spadix short and broad, length perhaps not exceeding breadth: fruit oblong, about 8–9 mm. thick and 12–13 mm. long, more or less flattened or compressed on one side. Middle elevations, Cuba.....12. *R. regia*

In this Enumeration it is not intended to redescribe all the entries but only the head species, *R. oleracea*, with which sooner or later the others must be compared and which sets the standard of characterization, and of course to account for the novelties.

1. **Roystonea oleracea,** O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 554 (1901). CARIBBEE ROYAL. Fig. 28.

Areca oleracea, Jacq. Select. Stirp. Amer. Hist. i, 278, t. 170 (1763).

Oreodoxa oleracea, Mart. Hist. Nat. Palm. iii, 166, t. 156 fig. 1, 2, t. 163 (1837).

Euterpe caribæa, Spreng. Syst. ii, 140 (1825).

Oreodoxa caribæa, Dammer & Urban, Fl. Portoricensis, 129 (1903).

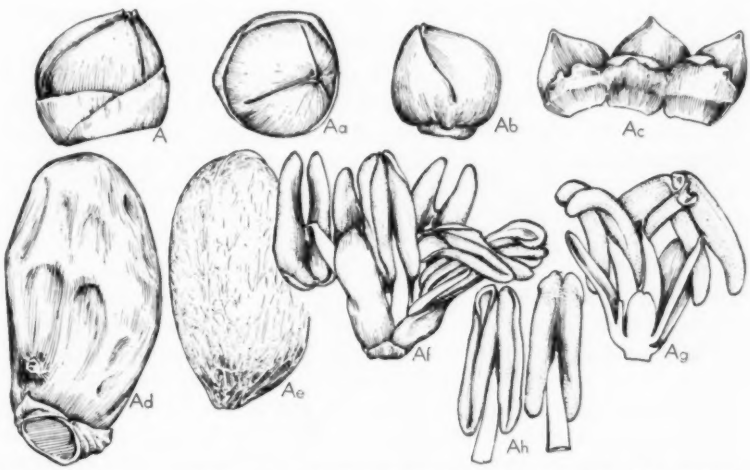
Roystonea caribæa, P. Wils. in Bull. N. Y. Bot. Gard. viii, 385 (1917).

Gorgasia maxima, O. F. Cook, and *G. oleracea*, in Nat. Hort. Mag. xviii, 112 (1939).

Greatest of the Roystoneas, reaching to 30 m. and more with basal diameter at 1 m. above ground of only 4.5 dm., and base of crownshaft at 25 m. or more, but commonly fruiting at lesser altitudes and thicker in

bole when standing separately, bulge at base conspicuous on young trees, rings left by fallen leaves usually prominent; crownshaft 2–5 m. long, swollen at base, smooth and bright green, comprised of great imbricated petiole sheaths inclosing internal terminal bud or "cabbage," leaf-blades extending widely and often horizontally from its apex, base of coma or leaf-crown straight (or flat) or sometimes ascending: leaves 3–7 m. long and 2 m. broad at middle, with 50 or more pairs of subopposite bright green pinnæ in a single series on either side; pinnæ to 1 m. long, central ones 5 cm. broad at middle, with about 4 pairs of secondary ribs supplementing the strong midrib: main or inside spathe-valve 1 m. and more long, often hanging singly after bursting; spadix white at opening, glabrous, soon becoming tan or brownish, the slender rachillæ much waved or undulated, at length perhaps becoming more or less straight; staminate flowers 6 mm. long at anthesis, narrow nerved petals valvate before expansion and usually shorter than the stamens; pistillate flowers about 3 mm. long, conic-pointed: fruit distinctly oblong, purplish to blackish at maturity, 16–20 mm. long when fresh at full growth, 8–10 mm. thick, straight or slightly depressed on one side and curved on back, lower end somewhat projecting outward so that the dried fruit may look sunken on the inner side; seed-shell 13–15 mm. long and one-half as thick, seed inside the thin shell or endocarp 10–12 mm. long, its surface roughened, with broad raphe markings.

Lowlands and low hills, Trinidad and Barbados, British West Indies. Assigned also to Tobago, one of the southernmost islands, but in two visits there I was unable to find it as if native, and this conclusion was



28. ROYSTONEA OLERACEA. A, Aa, pistillate flower-buds ×6; Ab, same with envelopes removed; Ac, inner view of calyx and corolla × about 4; Ad, fruit ×3; Ae, seed ×3; Af, Ag, Ah, staminate flowers and separate stamens × about 6.

also the opinion of Mr. F. D. Davis of the Agricultural office on the island. On other islands the species may be abundant but not in conditions that lead one to think it indigenous; it spreads freely from planted trees. Grisebach in his Flora of the British West Indian Islands, 1864, places it in the Bahamas, Jamaica to Barbados and elsewhere, but that was before other species had been distinguished. I have seen it but seldom as a planted tree in southern Florida, and not elsewhere in the United States.

Caribbee royal is a majestic tree for avenue planting. The individuals in a line may be more uniform in size and habit than those of any other great tree I know; yet there are differences in size and leafage of the crown; sometimes there are dissimilarities in the droop of the head, and are probably not indicative of different species in case the stock was carefully chosen at the planting.

Jacquin does not state the nativity of his *Areca oleracea* except that it was Caribbean. His picture of it (Fig. 194, Gent. Herb. iii, page 345) shows a tree with all the leaves ascending. Old engravings are likely to be diagrammatic or formalized and I have therefore not attempted to base diagnosis in this early habit sketch but depend more on the characteristic fruits detailed at the base of the tree.

I have subsequently seen *Roystonea oleracea* var. *excelsior*, Bailey (Gent. Herb. iii, 369, fig. 204, 1935), in other places than Demerara and I have come to regard it as an occasional stature form. The two trees contrasted in Fig. 204 were still standing in the Royal Botanic Garden, Georgetown, British Guiana, last year, the differences as marked as ever.

It is difficult to study the royal palms on Barbados because most of them appear to have persisted or spread from cultivation. Only in Turner's Hall Wood, in the Scotland district, do they appear in an apparent native stand, on the slope of an unreclaimed woodland. This Wood I visited first in 1922 and last in 1948. The trees are tall and slender, not columnar, leaf-crown not flat-based or umbrella-shaped in all cases. The fruits are like those in the Trinidad forests; and in these forests I have recently seen many trees like those in the Barbadan placement. In 1948 I again visited the remote Guayaguayare region of southeastern Trinidad and saw the remaining indigenous stands from which I took measurements of felled shafts in 1922 (Gent. Herb. iii, 367) and found the trees comparable with the native ones on Barbados. Barbadan royals were admired by Griffith Hughes who wrote on the natural history of the island in 1750, and called the great trees *Palma maxima*, and from this ante-Linnæan source Cook has recently derived the name *Gorgasia maxima*. On the Canal Zone one sees planted trees of *Roystonea oleracea* and other kinds that would require much study for identification. In comparing pinnæ and other parts of one

species from diverse situations in one or in different countries the observer is often puzzled by departures that may be of only subspecific value.

2. **Roystonea stellata,** León, in Mem. Soc. Cubana Hist. Nat. Felipe Posy, xvii, 11 and figs. (1943, discussion in French); Fl. Cuba, 239 (1946). WHITE PALM (Palma blanca). Fig. 29.

Tall palm to 15 m. with very long outer spathe 6.5 dm. long and dilated at base: fruit globose-obovoid, 11 mm. long, 8–9 mm. broad and slightly gibbose at base, micropyle stellate with 6 spreading elevations and many radiating lines.

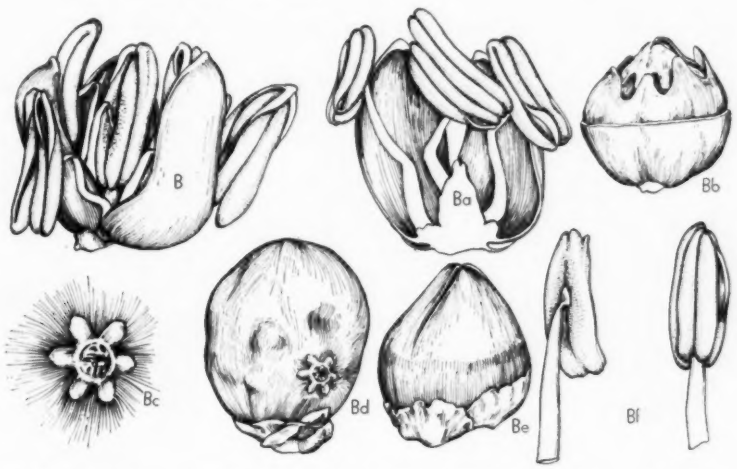
Southern Cuba, near Baracoa, finca Rafael Pérez.

3. **Roystonea princeps,** Burret, in Engler Bot. Jahrb. lxiii, 76 (1929). MORASS ROYAL.

Oreodoxa princeps, Becc. in Pomona Coll. Journ. Econ. Bot. ii, 266 (1912).

Described in Gentes Herbarum, iii, 379 (1935). Jamaica, in morasses and bogs.

4. **Roystonea lenis,** León, in Mem. Soc. Cubana Hist. Nat. Felipe Posy, xvii, 8 (1943); Fl. Cuba, 239 and fig. (1946). SILK PALM (Palma seda). Fig. 30.



29. ROYSTONEA STELLATA. B, Ba, flowers ×8; Bb, pistillate flower with corolla removed to show staminodal ring; Bc, micropyle with stellate placement; Bd, fruit ×3; Be, pistillate bud; Bf, stamens ×8. Cuba.

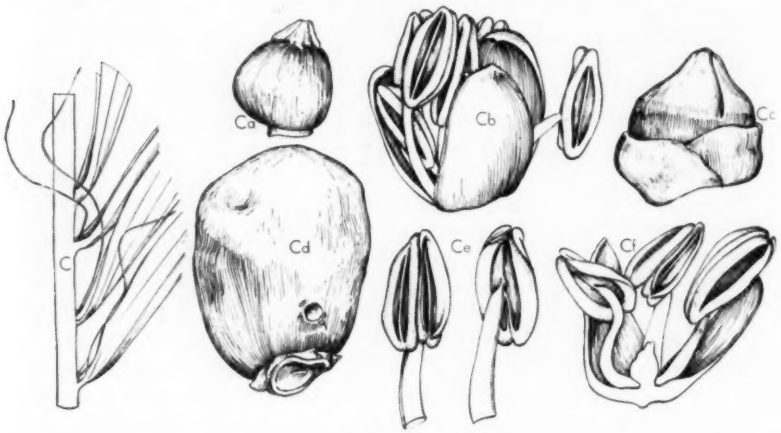
Lustrous palm mostly irregular trunk swollen at base with long filaments on the leaf-rachis: seeds oval, 10.5 mm. long and 7.5 mm. thick.

Southern Cuba, in Baracoa region.

† 5. **Roystonea venezuelana,** spec. nov. Fig. 31.

A *R. oleracea* differt foliolis in planis binis vel quarternis dispositis, cinereis glaucescentibus subter, minus valde nervosis longitudine: spatha prominenter sulcata intra et extra; pedunculis axibus spadicis minus planis et plus angulatis, ramulis minus arcuatis basi: fructibus crassioribus et aliquid brevioribus sine latere recto; semine in integumento multo minore. Arbor 25–30 m. alta, gracilis, 3–5 dm. diam., truncus non tumidus: folia longa, dense pinnata, ascendentia vel sublibrata, non declinata; foliola præcipua 3–4 cm. lata, 8–10 dm. longa, fusco-viridia supra, glauco-viridia vel cinerea subter, nervi laterales neque prominentes neque validi: fructus purpurei, oblongi lateribus curvis, 15–18 mm. longi, non valde rugati cum sicci; integumentum interius cum semine 9–12 mm. longum.

Tall slender tree with solitary trunk to 25 or 30 m. tall, 3–5 dm. diameter, base somewhat expanded when young but not tumid or swollen above, coma or crown of ascending or spreading or horizontal leaves, flat or not declined at base, the flowering and fruiting parts infrafoliar and well removed at base of crownshaft: mature leaves about 4 m. long, closely pinnate, deep green on upper face, conspicuously cinereous and glaucescent underneath, rachis more or less quadrilateral in cross-section bearing the pinnæ on the flat opposite sides in a duplicate or double-duplicate series, one of the two series extending at nearly right angles and the other upper series projected forward; pinnæ close together, middle ones 3–4 cm. broad and 8–10 dm. long, midnerve prominent, lateral nerves about 3 pairs and

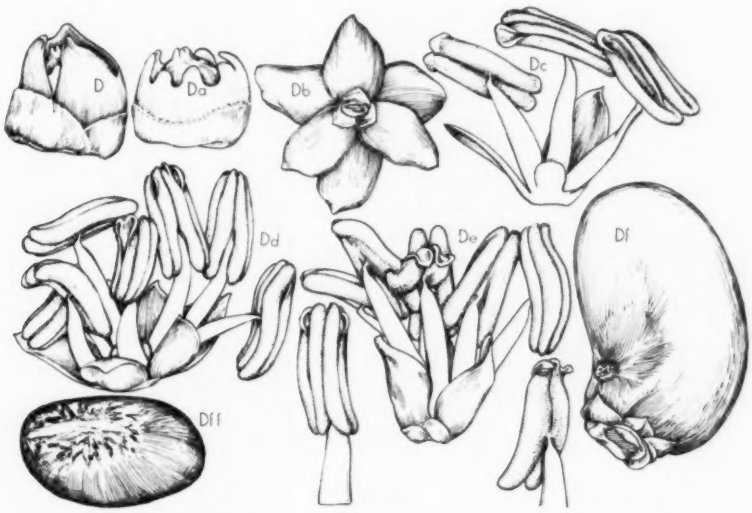


30. ROYSTONEA LENIS. C, leaf-rachis with filaments × about ½; Ca, pistil ×5; Cb, flower × about 6; Cc, pistillate flower; Cd, fruit ×3; Ce, Cf, stamens and section of flower ×6.

not strong or prominent, apex irregularly bifid: main or inner spathe 1 m. and more long and 18 cm. or more broad, long-pointed, ligneous, green outside but becoming brownish in age, light brown inside, stoutly closely and roughly ribbed lengthwise on both surfaces; spadix 6–8 dm. and more long, the short rachillæ at first nearly straight but at length becoming crooked and curled, not flaring, not markedly arcuate at base as they diverge from main axis, flowers and fruits superficial and not sunken in pits, axis or peduncle not prominently flattened but angled or cornered to nearly terete in section; staminate flowers about 15 mm. in broad expansion, the petals and sepals oblong and nearly twice as long as broad, petals valvate, stamens 6 or 7, with projecting versatile anthers; pistillate flowers nearly or quite as broad as long, 3–4 mm. long, sepals imbricate, petals valvate: fruit purple-black at maturity, oblong or broader, 15–18 mm. long, 12–14 mm. broad, narrowed to base; seeds oblong, obtuse at both ends, 10–13 mm. long, micropyle basal.

Eastern Venezuela: State of Yaracuy, in level rain forest at altitude of 75 m., *Steyermark 56858* (type); State of Monegas, deep forest in valley along Rio Amana about six kilometers west of Santa Barbara, at altitude of 165 m., *Steyermark 61776;* indigenous.

I had seen this tree in native stands from a plane and even then thought it to be distinct.



31. ROYSTONEA VENEZUELANA. D, pistillate flower ×6; Da, pistillate flower showing staminodes ×6; Db, basal view of flower showing bracts, sepals, × about 5; Dc, Dd, De, flowers × about 5; Df, fruit ×3; Dff, seed × 3.

6. **Roystonea violacea,** León, in Mem. Soc. Cubana Hist. Nat. Felipe Posy, xvii, 10 (1943); Fl. Cuba, 239 (1946). BLUE PALM (Palma criolla azul). Fig. 32.

Trunk cylindric with reddish bark and wood: flowers violet: fruit oblong, slightly flattened on one side toward base, 14 mm. long, 8 mm. thick.

Southern Cuba, near Baracoa.

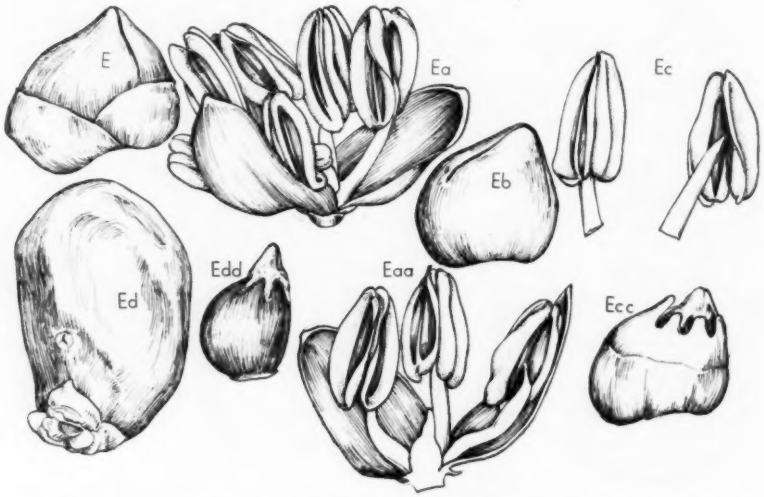
7. **Roystonea jamaicana,** Bailey, Gent. Herb. iii, 6 and figs. (1935). JAMAICA ROYAL.

Jamaica, on upland fields, slopes, hills and mountains.

8. **Roystonea borinquena,** O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 552 (1901). PUERTO RICAN ROYAL.

Described in Gentes Herbarum, iii, 378 (1935). Puerto Rico, widely spread.

Some authors contend that the nomen *R. caribæa,* P. Wils. (Spreng.), should displace *R. borinquena.* This question I reviewed in Gentes Herbarum, iii, 441 (1935), and decided that I could not throw down a certainty for an uncertainty.



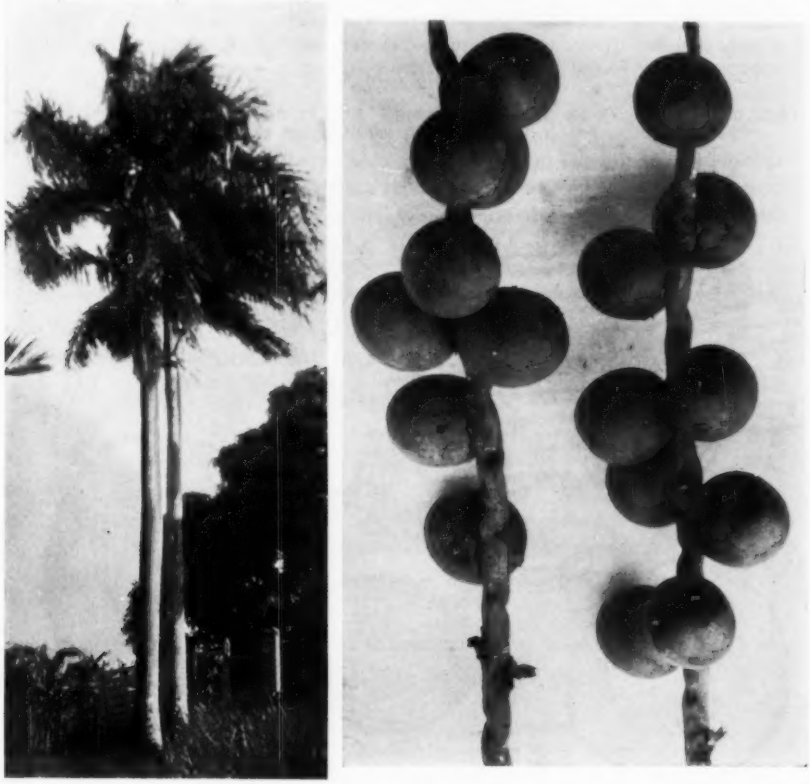
32. ROYSTONEA VIOLACEA. E, pistillate flower ×6; Ea, staminate flower ×6; Eb, pistillate with calyx removed; Ec, stamens ×6; Ed, fruit ×3; Edd, pistillate flower-bud; Eaa, staminate flower in section ×6; Ecc, pistillate flower with staminodial ring.

9. **Roystonea hispaniolana,** Bailey, in Gent. Herb. iv, 268 (1939), with figs. HISPANIOLAN ROYAL.

Hispaniola, abundant in republics of Haiti and Santo Domingo.

† 10. **Roystonea peregrina,** spec. nov. ROUND-FRUITED ROYAL. Figs. 33, 34.

Arbor erecta ad 10 m. vel plus alta, trunco recto non distincte ventricoso etiamsi crasso medio et fastigato ad apicem: folia pæne librata et curva apice, non tam pendula ut inflorescentiam involvant; foliola uniseriata, conduplicata, striata in longitudinem, albida non argentea sed minute pilosa subter, 3–4 cm. lata: spadices rigidi, mox deflexi, rachillæ parallelæ rachi, rectæ, 4–5 mm. crassæ cum siccæ, minute pubescentes,



33. ROYSTONEA PEREGRINA. Trees in Guadeloupe. Fruits natural size, about as long as broad.

amplificatæ basi: fructus subglobulares vel valde brevioblongi, 13–16 mm. crassi longique, obtusi finibus et non fastigati ad basin, micropyla subbasalis; semen valde latum, rotundatum vel obtusum, circa 6 mm. latum et 7 mm. longum.

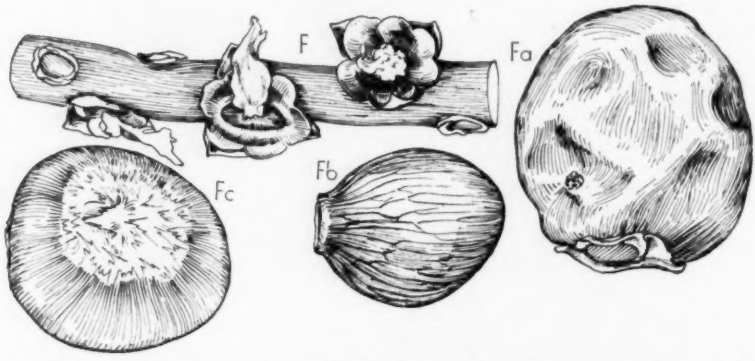
Strictly erect tree 10 m. and more tall with broad somewhat drooping coma that does not involve the large flowering and fruiting clusters, crown-shaft well marked, bole not ventricose although perhaps thickest at or above the middle, tapering to apex under the spadices: leaves long-pinnate, widely spreading and the lowermost more or less downward-curved, green above, lighter colored but not silvery underneath and minutely pubescent under good lens; leaflets uniseriate, 3–4 cm. broad, soon conduplicate, several-ribbed lengthwise: spadices with soon hanging rachillæ that are thickened or bulbose at base, standing parallel with axis and stout, 4–5 mm. thick when dry and thinly pubescent: fruit globular to very short-oblong with rounded ends and sides not flattened nor constricted to base, closely sessile, 13–16 mm. diameter either way when fresh, micropyle subbasal; seed rounded or obtuse, veiny, about 7 mm. long and 6 mm. broad.

Guadeloupe, French West Indies, planted on grounds of M. Adrien Questel at Montebello on Basse-Terre, origin and nativity unknown; supposedly in other collections; a strikingly different royal particularly in its large rounded not flat-sided or tapered fruits.

11. **Roystonea elata,** F. Harper, in Proc. Biol. Soc. Wash. lix, 29 (1946). Florida Royal. Fig. 35.

Palma elata, W. Bartram, Travels, London Ed. iv, 115, 116 (1794).

Roystonea floridana, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 554 (1901).



34. Roystonea peregrina, the round-fruited royal. F, rachilla at post-anthesis ×1⅛; Fa, fruit beginning to shrivel, × about 3; Fb, Fc, seed × about 3, very broad.

Very slender tree of low land and deep swamps in southern Florida and extensively planted; latterly referred to the upland and hillside *R. regia* of Cuba but apparently well distinguished by the contrasts on page 120.

12. **Roystonea regia,** O. F. Cook, in Science, ser. ii, xii, 479 (1900), in note; Bull. Torr. Bot. Club, xxviii, 554 (1901). CUBAN ROYAL. Fig. 36.

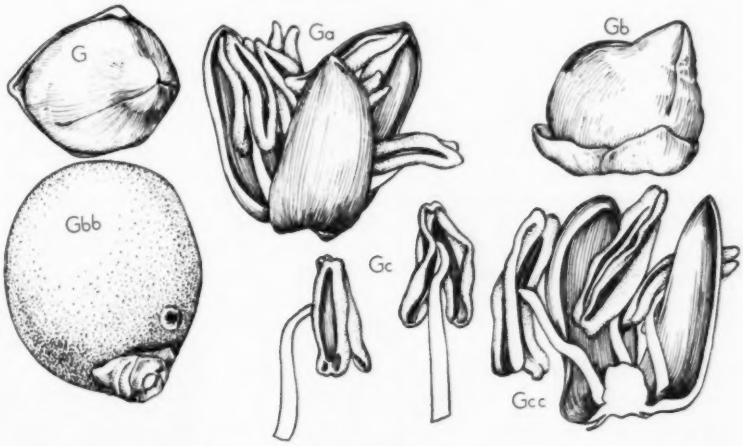
Described in Gentes Herbarum, iii, 370 (1935). All over Cuba in fields, on slopes and hills, abundant about sugar plantations, much planted.

R. regia var. **maisiana,** Bailey, Gent. Herb. iii, 376 (1935).

Eastern end of Cuba, back of Cape Maisi, 500 m. altitude. A very slender scarcely ventricose palm with small spreading crown: fruit briefly oblong-globose, 13–14 mm. long, 10–11 mm. thick.

R. regia var. **pinguis,** Bailey, op. cit. 378.

Imías River, Oriente, Cuba. Very tall tree, 30–40 m.: fruit large and oleiferous, subglobular, 14–15 mm. long, 10–11 mm. thick.



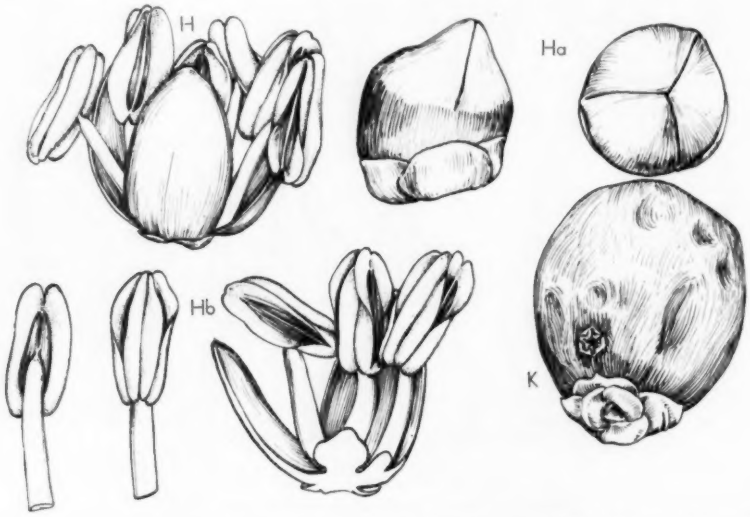
35. ROYSTONEA ELATA (*floridana*). G, pistillate flower ×2-3; Ga, staminate flower ×6; Gb, pistillate flower side view ×2-3; Gbb, fruit ×2½, not yet shrivelled; Gc, Gcc, stamens, staminate flower in section ×6.

AA. *Species inconfirmatæ vel dubiæ*

Palms in South America or farther West Indies with very small fruits nearly or quite globular, 7–9 or 10 mm. thick, regular in form when dry because of relative lack of shrivelling parenchyma, not flattened on one face. See page 119.

In Kew Bulletin for 1906 C. H. Wright described two species of Euterpe, at a time when distinctions between Euterpe and Roystonea had not been fully established. They were palms of British Guiana, one cultivated in the Botanic Gardens there and the other in the city of Georgetown, nativities unknown,—*E. ventricosa* and *E. Jenmanii*. In 1929 Burret placed *E. Jenmanii* in Roystonea, and made *E. ventricosa* a synonym of it without change of name. These two plants are singular among all the Roystoneas for their small fruits, 8.4 mm. diameter in *Jenmanii* and 6.3 mm. in *ventricosa* as originally described. In my treatment of Roystonea in 1935 (Gent. Herb. iii) I accepted the Burret handling of *Jenmanii* and referred *ventricosa* to *R. regia*.

I am now fortunate to have received from Kew a few fruits from the type material of each species, *Wright 2057* for his *E. Jenmanii* and *Wright 7574* for his *E. ventricosa*. These fruits show the reason for their littleness, —they are empty shells, as if never fecundated; yet the shells are clearly Roystonea rather than Euterpe, and both names must be taken away from the genus under which they were first described. In making new diagnoses, I have taken characters mostly from the Latin accounts by Wright, leaving it for future students to identify and more fully describe the living plants, and perhaps to modify the diagnoses.



36. ROYSTONEA REGIA. H, staminate flower × about 8; Ha, pistillate flower, side and top view ×8; Hb, stamens and longitudinal section of staminate flower; K, fruit with micropyle ×3.

In several trips I have seen plants going under these names more or less planted about Georgetown, British Guiana, where they were found or introduced by George S. Jenman, Superintendent of the Botanic Gardens there, but the labelling of the trees is not clear. In 1922 I found *R. Jenmanii* in the Botanic Gardens at Roseau, Dominica "from Jenman." I now take this tree, Fig. 37, as representative of the species and other trees on streets in Georgetown as representative of *ventricosa*. I have specimens, including ripe fruits and photographs, of both species. Fig. 40 shows ripe fruits from these trees, larger than in the immature originals.

Roystonea Jenmanii, Burret, in Engler Bot. Jahrb. lxiii, 76 (1929), without diagnosis. Figs. 37, 40.

Euterpe Jenmanii, C. H. Wright, in Kew Bull. 1906, 203; Waby, in Journ. Bd. Agr. Brit. Guiana, xii, 54 (1919), "one of the prettiest palms."

Trunk erect, 6–9 m. tall, lightly ventricose at middle: leaf-rachis triangular, smooth; leaflets linear-lanceolate, acuminate, 7.5 cm. long, 2.5 cm. broad, nerves about 10 and slender: panicle densely much-branched, branchlets terete, glaucous, densely flowered; staminate flowers with subreniform imbricate sepals 1 mm. long, petals oblong-lanceolate, 4 mm. long and 2 mm. broad, stamens 6 and equal to petals with filaments compressed, anthers sagittate and dorsifixed, ovary rudimentary, small and 3-lobed; pistillate flowers with strongly valvate scariose oblong sepals that are 1.5 mm. long and 3 mm. broad, corolla 3.5 mm. long, triangular lobes acute, valvate and equalling the tube, staminodes connate and adnate to the corolla-tube, the lobes triangular-obtuse, ovary obliquely ovoid, the stigma excentric: dry drupe shortly oblong-globose, 10–13 mm. long, 10 mm. thick, shell not shrivelling, calyx-cup small but prominent; seed strongly veined. Differs from *R. ventricosa* particularly in trunk less and not irregularly ventricose and unlike larger fruit.

Nativity unknown. Named for George S. Jenman. Waby wrote in 1919 that Jenman found three plants growing on one of the parapets in the center of the city of Georgetown, from which he obtained fruits and raised seedlings; perhaps native in the hinterlands. In 1880 Jenman had published on a botanical collecting trip made in 1879 on the Corentyne River in British Guiana. In my early paper on the Roystoneas (Gent. Herb. iii) in 1935 I used a photograph (Fig. 212 in that fascicle) of virgin trees supposed to be *R. Jenmanii* growing in the Botanic Garden in Georgetown, British Guiana, but in subsequent visits to that place I had reason to doubt the authenticity of those trees.

37. ROYSTONEA JENMANII, tree in center. In Botanic Garden, Roseau, Dominica, in 1922, "from Jenman."

† **Roystonea ventricosa,** trans. nov. Figs. 38, 39, 40.

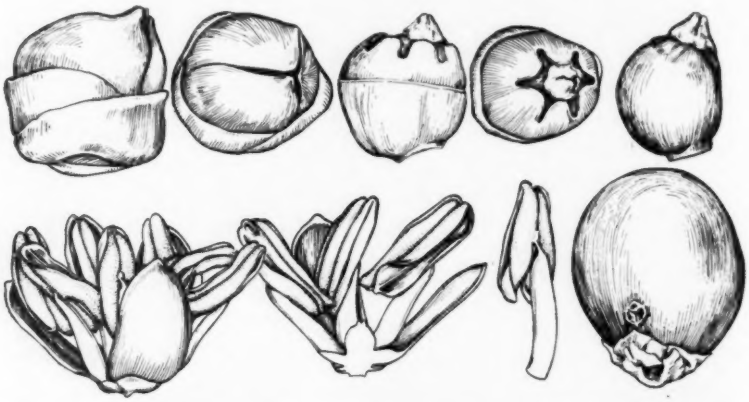
Euterpe ventricosa, C. H. Wright, in Kew Bull. 1906, 203.

Trunk erect, 6–9 m. tall, ventricose at middle or below, narrowed toward top and about 7.25 dm. diameter: leaf-rachis triangular, glabrous; leaflets oblong-lanceolate, about 12 dm. long and 4.4 cm. broad, about 12-nerved: spadix very much branched, ultimate branchlets 2.25 dm. long, 2 mm. broad, terete, glaucous, densely flowered; staminate flowers with suborbicular imbricate sepals 1 mm. long, the oblong subacute valvate

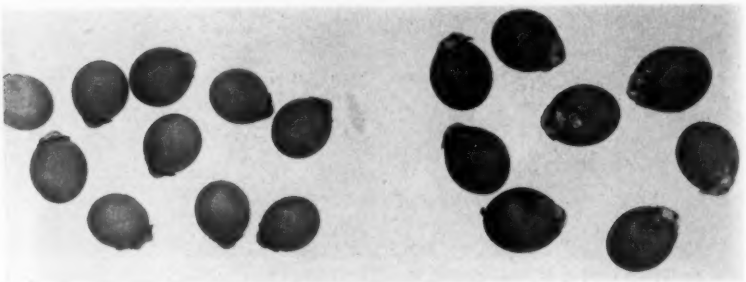
38. ROYSTONEA VENTRICOSA, at left, on Church St., Georgetown, British Guiana. The taller trees in distance right, with flat-bottomed head, are *Roystonea oleracea*; shorter trees underneath are probably *R. ventricosa.*

petals 4.7 mm. long, filaments shorter than petals and compressed, anthers dorsifixed and divergent at base, ovary rudimentary and small and 3-lobed; pistillate flowers with broadly deltoid obtuse or sometimes mucronate sepals, corolla trilobate, 3 mm. long, the lobes broadly triangulate and one-half as long as the tube, staminodes 6, connate, adnate to corolla-tube, lobes rotundate, ovary obliquely ovoid: dry drupe seedful, oblong-globose, 10 mm. long, 9 mm. thick, not shrivelling.

To Wright this plant was known as "cultivated in the Botanic Gardens, Georgetown," British Guiana. The species is not now recognized in that garden, but is thought to be well represented in plantings along Church Street in Georgetown (where I have collected and photographed it).



39. ROYSTONEA VENTRICOSA. Top row, pistillate flower lateral and apical view; corolla removed to show staminode ring, side and top; pistil; all ×6. Bottom row, staminate flower and lengthwise view, stamen, ×6; fruit ×3.



40. FRUITS OF ROYSTONEAS, natural size. Left, *R. ventricosa*; right, *R. Jenmanii*.

3. EXTENSIONS IN THE GRU-GRUS: ACROCOMIA

Genus Acrocomia was founded by Martius in 1824 with one species, *A. sclerocarpa*, in Brazil. In 1941 the genus was newly brought together in a consecutive treatment called a "preliminary paper" (Gent. Herb. iv, fasc. xii). We now come to a consideration of the first additions to that paper.

The primary problem is identification of the original *Acrocomia sclerocarpa*. When only one species was known it was of course impossible to make out the important characters of separation, and *A. sclerocarpa* has had no definite locality or any authentic original description since Martius. It has been attributed to many countries and demonstrated in none. Barbosa in his great work Sertum Palmarum Brasiliensium, merely lists *A. sclerocarpa* without information or locality. In my paper of 1941 I stated that my diagnosis of the species was "assembled from Martius, not drawn from specimens." Probably Martius covered more than one species or even a single genus. I now have made diagnosis directly from specimens without reference to Martius; and it is surprising how closely the two accounts correspond.

In the perplexity as to the meaning of *Acrocomia sclerocarpa* I asked Dr. Ahmes Pinto Viegas, head of the Department of Plant Pathology of the Instituto Agronomico at Campinas, state of São Paulo, Brazil, to aid me with material so that a new approach can be made. He has responded effectively with specimens, photographs and notes; he deserves the gratitude of palm students.

Acrocomia is now represented by species from Argentina and Paraguay to Mexico and in the West Indies to Jamaica and Cuba, twenty-nine species of them. It is not surprising to find that we know six species in the Lesser Antilles alone, and I hear of others for which specimens are not available.

The West Indian species here described belong apparently in the group of *A. fusiformis*.

Acrocomia sclerocarpa, Mart. Hist. Nat. Palm. ii, 66, tt. 56, 57 (1824). Section *Tectocomia*. Figs. 41, 42, 43.

Tall straight erect tree; trunk not tumid, nearly uniform in thickness, roots apparently not showing at base, conspicuously marked with the permanent boots or steps of old leaf-bases and carrying many slender weak mostly upward-pointing spines, armature and sheaths prominent on young trees; coma loose and open, the lower recurving foliage surpassing but not hiding the inflorescences: leaves loosely and very narrowly pinnate, green on upper face, silvery and pubescent on lower face; pinnæ 2 cm. or less broad, closely scarious on margins, secondary ribs not evident, thin parallel veins prominent; petiole and midrib markedly armed with flat

brown-black very sharp upwardly-pointing spines 2–9 cm. long: spathe 1 m. plus long, tapering to point, closely tomentose, bearing weak spines to 6 dm. long until they are weathered away: fruit spherical and slightly tapered toward base to almost globular, 4–4.5 cm. thick and of equal height, apex a very small and short point, calyx large with flaring obtuse appressed

41. ACROCOMIA SCLEROCARPA of Brazil, representative trees of the Tectocomia class, the old boots or steps showing on the high trunk and on the detail at left.

lobes; nut or seed small, irregular when the shaggy covering has disappeared, 2–2.5 cm. across when dry.

Southern Brazil, Estado de São Paulo, open field on estate of Chacara des Très Irmas at São Joao de Boa Vista, not far from Pardal, Francisco Antonio Mansini proprietor, communicated by *A. P. Viegas* numbers *7144, 7917, 9365;* above description drawn from these materials. The fruits as well as young leaves are much eaten by pigs.

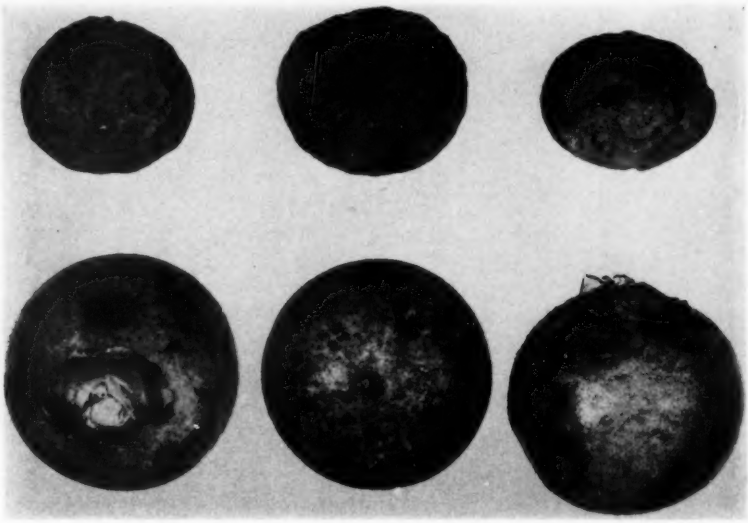
42. ACROCOMIA SCLEROCARPA, showing the fruiting clusters subtended by their spathes, and the adhering petioles that will leave their bases on the bole.

Acrocomia lasiospatha, Mart. Palmetum Orbignianum, 81 (1847). Fig. 44; Gent. Herb. iv, 475 (1941).

Trunk mostly solitary: leaf long-pinnate, blade 3 m. and more, grayish but not silvery underneath; petiole nearly or quite 1 m. long and sheathed at expanded base with loose split webbing, with rusty-tomentose margins and bearing on central ridge white-based weak flat black more or less ciliate spines 2–4 cm. long; pinnæ very many, unarmed, glabrous on both surfaces to the ordinary lens but seen to be minutely hairy-pubescent under 20 magnification at least on under surface, 2–3 cm. broad, lacking secondary ribs but bearing several closely parallel veins; midrib of leaf with few flat weak spines 1–3 cm. long, not tomentose: spathe 1 m. or more long, densely brown-woolly-tomentose and carrying a few short spines on rib, apex very short or not prolonged, with few very short spines or prickles near tip and two or three converging costæ or ribs; spadix simple, rachillæ essentially glabrous and undulate toward base: fruit slightly compressed, 3–4 cm. broad and nearly as high, beak minute, surface smooth, calyx with obtuse appressed thin lobes.

Open places, Paramaribo, Surinam (Dutch Guiana), South America; a young tree about 6 m. tall, collected by Gerold Stahel.

For want of a better disposition I apply to this Surinam gru-gru the binomial *Acrocomia lasiospatha* of Martius, based by him on a spathe collected long ago by Plukenet supposedly in French Guiana (see Bailey, Gent. Herb. iv, 475, 1941). This name has not heretofore been identified,



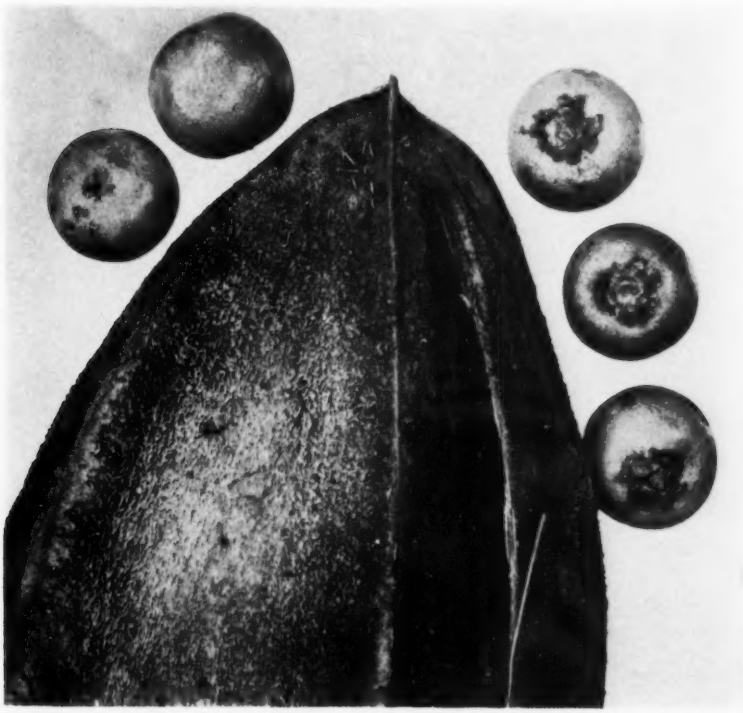
43. ACROCOMIA SCLEROCARPA, natural size, nuts or seeds above, fruits on lower line.

and it is the only Acrocomia attributed to the Guianas. There are no published pictures of it. Martius discusses *A. lasiospatha* in connection with *A. fusiformis* and *A. aculeata*, but these confusions are now not germane. This Surinam species is probably of the section Sentocomia. The taxonomic relationship is apparently with *A. aculeata* of Martinique.

† **Acrocomia Viegasii,** spec. nov. Section *Sentocomia*. Figs. 45, 46, 47.

Arbor gracilis, annulata altaque; truncus solitarius, interdum non rectus, pæne uniformiter crassus, fere inermis, vix columnaris: folia non argentea subter, glabra; pinnæ 1.5 cm. vel minus latæ; petiolus et costa media debilibus spinis albis basi 2–8 cm. longis: fructus sicci brevipyriformes, 3–3.5 cm. lati et alti, apex pæne vel admodum sine acumine, superficies nitida; nux fere obscure pyriformis, postea aliquid angularis.

Tall slender erect tree; bole either straight or crooked, not tumid and perhaps not columnar, bluntly and irregularly ringed, not spiniferous;



44. ACROCOMIA LASIOSPATHA, Surinam, ¾ natural size. Tip of woolly spathe, and mature fruits.

coma large and dense, lower foliage arching downward and covering the inflorescences: leaves openly pinnate, light green, not silvery underneath, glabrous on both surfaces; pinnæ very narrow, 1.5 cm. or less broad, lacking secondary ribs but carrying longitudinal veins prominent on upper surface; petiole and midrib roughly tomentose, bearing white-based weak brown spines 2–8 cm. long: rachillæ of spadix glabrous, slender, staminate fossa-cups divaricate, staminate flowers 4–5 mm. long: dry fruit about 3–3.5 cm. broad, briefly tapered to base and therefore somewhat short-pyriform, height about equal to breadth, surface shining, calyx with closely pressed obtuse lobes, apex pointless or essentially so; nut large, filling the shell, but somewhat angled when weathered and integuments lost.

Southern Brazil, Estado de São Paulo, at Campinas, in open fields at Pitangueiras, sent by *A. P. Viegas*, number *7143*. Probably allied to *A. Totai* and *A. Chunta*.

† **Acrocomia christopherensis,** spec. nov. Section *Sentocomia*. Figs. 48, 49, 50.

Arbor alta, erecta columnarisque armatura parva debilique; truncus solitarius, 10 m. vel plus altus, fastigatus ad basin, annulatus, nudus vel pæne nudus: folia multa, longa, folia inferiora conspicue pendentia, argentea et tenuiter pilosa subter, pinnæ 1–2 cm. latæ, multis venis gracilibus; petiolus et costa media furfuracea, multis spinis sparsis planisque 5 mm. ad 4 vel 5 cm. longis: spatha brevi projectione apice, pæne vel admodum expers spinarum: fructus depressi, 4 cm. lati, 3–3.5 cm. alti, glabri sed fere maculati, apex minutus; semen circa 3 cm. crassum, regulare, scarium in marginibus.

Tall columnar tree; trunk solitary to 10 m. or more and expanding upward from a tapered base, prominently ringed but nearly or quite devoid of spines (at least in its mature state), not distinctly tumid or bulged

45. ACROCOMIA VIEGASII, southern Brazil. An abounding field gru-gru.

at any one point; coma heavy, with long-hanging leaves that cover the inflorescence: leaves with many pairs of very narrow pinnæ that are silvery underneath under an ordinary lens, sometimes gray to almost silvery on upper face; pinnæ or segments not much if at all exceeding 2 cm. broad, strong secondary ribs lacking but parallel veins prominent; petiole and midrib loosely tawny-furfuraceous, bearing scattered fuzz-margined weak flat spines 5 mm. to 4 or 5 cm. long: spathe nearly or quite devoid of armature, apex developed into a short narrow prong; spadix glabrous, peduncle with few if any short spines, rachillæ with deep sharp-edged staminate fossæ: fruit depressed, about 4 cm. broad and 3–3.5 cm. high,

46. Acrocomia Viegasii. A Sentocomia species, showing the self-cleaning trunk at right.

smooth and glabrous but more or less brown-maculate when mature and dry, calyx closely appressed with lobes scarious-margined and obtuse, apical point minute; nut or seed about 3 cm. thick, broader than high, covered before weathering with scarious adherences, regular in outline.

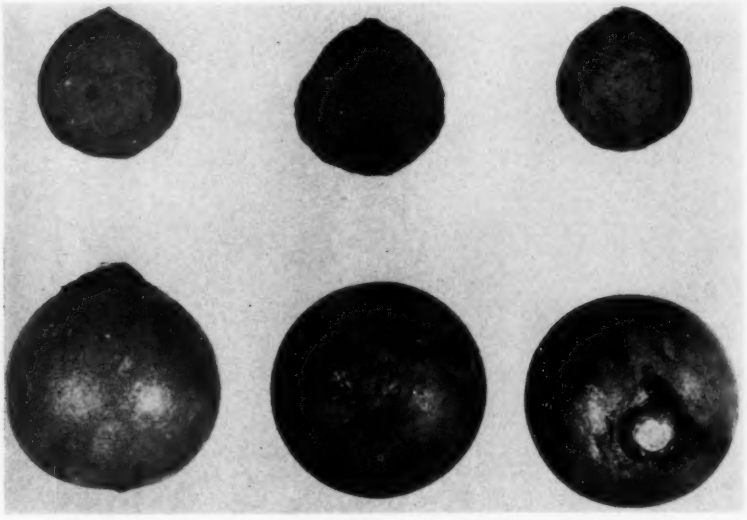
St. Christopher (St. Kitts), Leeward Islands, British West Indies, edges of woods on lowish lands at Ottley's plantations, *Bailey 404*.

A noble columnar tree with very few and short spines, trunk of mature trees unarmed, very narrow strongly nerved pinnæ, and large fruits. I am told that one of the trees in Fig. 48 is now fallen, having come to its inevitable end.

† **Acrocomia antiguana,** spec. nov. Section *Sentocomia*. Figs. 50, 51, 52.

Arbor alta, erecta columnarisque ad 20 m., circulis elevatis ferentibus multas nigras spinas deflexas deciduasque 2–4 cm. longas: folia cineracea sed non argentea subter; pinnæ multæ, 1–2 cm. latæ, venæ graciles; petiolus et costa media multis spinis gracilibus 3–12 cm. longis: spatha 1 m. vel plus longa, gradatim longiacuminata, tomentosa, fere inermis; pedunculus spadicis multis spinis, 1–2 cm. longis: fructus depressi, 3–3.5 cm. crassi, 2.5–2.7 cm. alti, apex minutus; semen irregulare vel angulare, 2 cm. vel minus crassum.

Erect columnar tree to 20 m. tall; trunk separate even if in colonies, gradually somewhat thickened at about the middle, irregularly but not deeply ringed, bearing many short deflexed black spines 2–4 cm. long



47. Acrocomia Viegasii, natural size. Nuts or seeds in top row, three fruits below.

borne on the concentric ridges and soon deciduous; coma fairly dense and heavy and covering the inflorescences: long leaves compact with many very narrow pinnæ 1–2 cm. broad, glabrous under the ordinary lens but thinly hairy-pubescent underneath under a high power, somewhat grayish but not silvery underneath, parallel side veins close together and very

48. ACROCOMIA CHRISTOPHERENSIS, on island of St. Christopher (St. Kitts).

slender; petiole and midrib bearing many brownish slender white-based spines 3–12 cm. long: spathe 1 m. and more long with a gradual long apical point, provided with a close tawny tomentum but unarmed or soon becoming so; spadix glabrous, its peduncle well covered with spines 1–2 cm. long: fruit depressed, small, 3–3.5 cm. broad, 2.5–2.7 cm. high at dry maturity, point very small, calyx appressed, lobes irregular and obtuse; nut or seed irregular or angular in outline, 2 cm. or less thick.

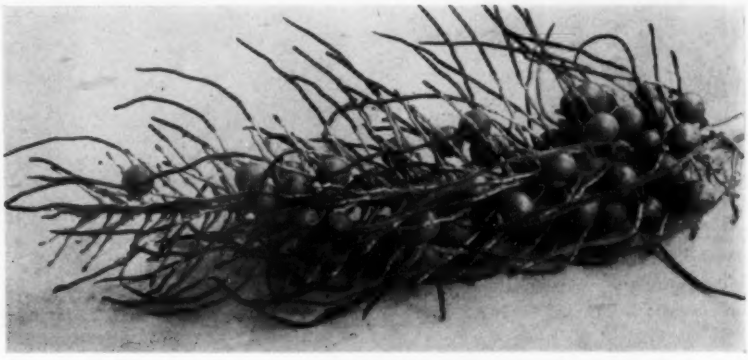
Antigua, Leeward Islands, British West Indies, in lowish but dry place foot of hills at Tremontania, *Bailey 609*, and seen elsewhere.

Columnar tree with abundant downward-pointing spines on trunk but which may disappear by weathering, very narrow but not strongly nerved pinnæ, noticeably small fruits.

† **Acrocomia grenadana,** spec. nov. Section *Sentocomia*. Figs. 50, 53.

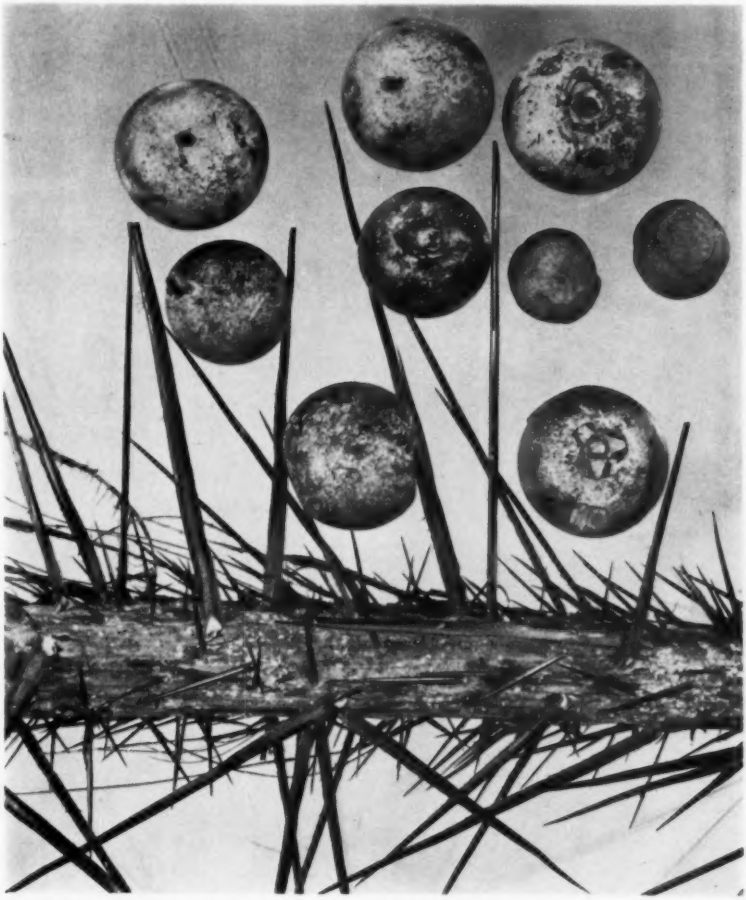
Suberecta sed non columnaris, recta vel aliquid inclinans, 15 m. alta; truncus irregularis crassitudine, annulatus spinis sursum tendentibus superficies aspera, radices sæpe prominentes basi: folia viridia supra, subter argentea, pilosa per pilam vitream potentem; pinnæ angustæ, 1–2 cm. latæ, costæ secundariæ non evidentes, venæ laterales prominentes; petiolus flocculentus, multis planis brunneisque spinis 1–20 cm. longis: spatha 1 m. vel plus longa, lata, fastigato-acuminata, tomentosa, inermis: fructus sicci depressi, 4 cm. crassi, 3.5 cm. alti, apex minima; nux pæne globularis, regularis, 3 cm. crassa.

Upright but not straightly columnar tree to 15 m. tall, often somewhat leaning, the trunk more or less irregular or uneven in thickness and rough, not tumid, obscurely ringed with upward-pointed flat spines or the rings prominent on young trees, the stand likely to be involved in fallen petioles and leaf-blades and to present an untidy appearance and showing roots at the base; coma rather dense, the hanging foliage covering the inflorescences: leaves openly pinnate, silvery underneath, sparsely pilose under a



49. SPADIX OF ACROCOMIA CHRISTOPHERENSIS. About 1 meter long.

lens of 20 diameters; pinnæ narrow and well separated from each other, 1–2 cm. broad, secondary ribs not present but parallel veins prominent; petiole and midrib more or less flocculent or tomentose, ferociously armed with flat brown spines 1–20 cm. long that are woolly-based and pointed mostly in a horizontal or upward direction: spathe about 1 m. plus long, very broad, taper-pointed, firmly tawny-tomentose, not armed: dry fruit somewhat flattened endwise, variable in size, typically nearly or quite 4 cm. thick and 3.5 cm. high, apex very small, calyx small and closely



50. THREE WEST INDIAN ACROCOMIAS, one-half natural size. Top row, three fruits of *A. christopherensis*; middle row, two fruits and two seeds of *A. antiguana*; bottom, two fruits and petiolar spines of *A. grenadana*.

appressed with obtuse lobes; nut or seed nearly globular, regular, 3 cm. thick, covered at first with shag.

Grenada, Windward Islands, British West Indies, widely spread on hills and valley slopes, particularly conspicuous on Richmond Hill by St. Georges, *Bailey 430*.

51. NATIVE GROVE of *Acrocomia antiguana*.

Tree of irregular not straight or columnar habit, many upward-pointing ringed spines, exposed roots at base, pinnæ silvery underneath, medium-sized fruits.

4. TWO OF THE MANY PROBLEMS IN THE STAR-NUT PALMS: ASTROCARYUM

We do not know even a vernacular name that covers the many species of these odd palms, and therefore I anglicize the generic title, Astrocaryum, which when made into Latin from the Greek means star-nut from the fact that the micropyle of the hard nut is surrounded by radiating stellate marks or lines in its removable epidermis, as testified by G. F. W. Meyer when he founded the genus in 1818 on a plant from British Guiana. The species are forty-five as recognized by Burret in his enumeration in 1934. Many vernaculars are applied to the species by natives of Trinidad, the Guianas, Brazil, Peru, and northward to Mexico, and some of these epi-

52. DOWNWARD-POINTING SPINES on trunk of *Acrocomia antiguana*.

thets have become binomials in formal taxonomy and are spelled preferably with a capital letter to show that the word is in apposition and does not agree in its termination with the neuter Astrocaryum; some of these strange binomials are *Astrocaryum Awarra*, *A. Burity*, *A. Chambira*, *A. Guara*, *A. Huaimi*, *A. Huicungo*, *A. Jauari*, *A. Malybo*, *A. Munbaca*, *A. Murmuru*, *A. Paramaca*, *A. Tucuma*. There is much confusion as to the application of these and other binomials, for the trees or bushes may inhabit inaccessible places, the formidable spines dispel the collector's enthusiasm and the long harsh pinnate leaves are difficult to manipulate into museum specimens. Alfred Russel Wallace writes of them in his Palm Trees of the Amazon, 1853, that "they have rather a repulsive aspect, from almost every part,—stem, leaves, fruit-stalk and spathe—being armed with acute spines in some cases a foot long." All these formidablenesses make these palms challenging subjects to the ardent collector.

53. ACROCOMIA GRENADANA. Right, upward-pointing spines on trunk.

Meyer, the original author, described only one species, *Astrocaryum aculeatum*. This species has never been illustrated and Burret does not know what it is and even doubts whether it belongs to the genus Astrocaryum, thereby raising a troublesome question in nomenclature. There appear to be no authentic specimens.

Identity of *Astrocaryum aculeatum* is not the only troublesome taxonomic problem in the genus. In 1845 Liebmann described *A. mexicanum* from southern Mexico. This species was by Burret, 1934, made the type of a new genus Hexopetion (a disposition with which I am in sympathy) and to it referred *Astrocaryum rostratum*, Hook. f. in Botanical Magazine, 1854, a very different palm supposed to be native in Brazil and frequently planted in the American tropics. This confusion is now under study, but is not yet ready for publication.

In describing *Astrocaryum aculeatum* Meyer compared it with Jacquin's *Elæis guineensis*, the oil palm, which grew in Martinique, French West Indies, as an introduced plant, and cites *Bactris minima* of that island as a probable synonym, but this latter palm is accounted for in the present paper as an Aiphanes. The citation of the gregarious oil palm as to habit should aid us in determination of *A. aculeatum*, to which necessity we now come.

Aculeatum star-nut

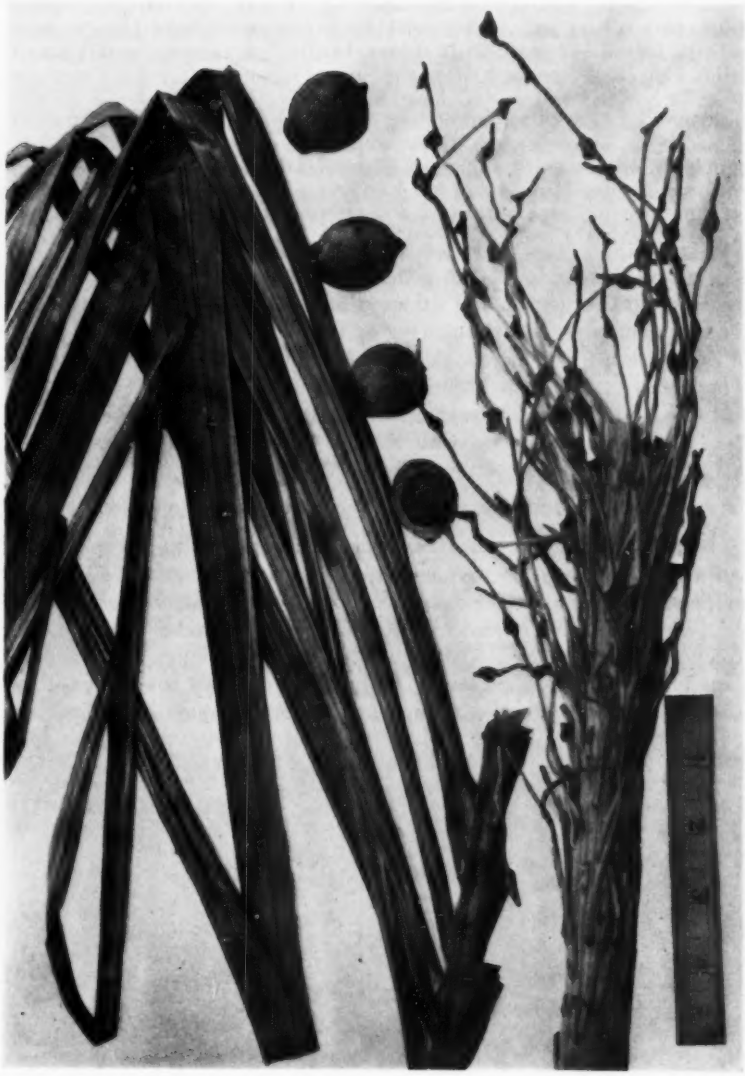
Our palm, *Astrocaryum aculeatum*, was taken, under the name Aguire, on the Essequibo River in British Guiana, South America, which in its lower course runs parallel with and close by Demerara River, where in a rain forest in 1948 I collected a palm I am impelled to identify as *A. aculeatum;* and thus I may aid in clarification of an historic problem. There may be dissimilarities between my specimens and the original diagnosis in 1818 (when close measurements were not recorded) but they are all minor and I think explicable. Spathe in my material is twice longer than in Meyer's, but he had the plant in flower and I only in fruit. Whether the mature fruit is subrotund or ovoid-oblong depends on how many of the three locules are fertile. The real solution of these relationships can come only when the Essequibo and Demerara occurrences are carefully collected.

It is interesting that in the Buitenzorg Gardens in Java a palm was growing in 1936 as *A. aculeatum*, attributed to New Granada (Colombia); I have good material of it and it matches mine.

Astrocaryum aculeatum, G. W. F. Mey. Primit. Fl. Essequeboensis, 266 (1818). Figs. 54, 55, 56.

Erect to 8 m., in clumps of several or few rough or nodal trunks and coma of ascending long-pinnate leaves: pinnæ many, scattered or in groups, light green and shining above, light colored underneath, glabrous,

54. Astrocaryum aculeatum, in Demerara forests, British Guiana. Identification yet more or less tentative: see page 149.



55. ASTROCARYUM ACULEATUM, Demerara. Foliage, part of spadix, fruits × about ⅓.

linear-lanceolate to almost linear, 1 m. or more long, 2 cm. or less broad, strongly secondarily ribbed, margins aciculate and revolute; petiole flat on one surface, rounded on the other side, bearing scattered flat spines 2 cm. or less long and minute pricklets intermixed: spathe narrow, nude or with only a few small weak spines, hardly furfuraceous: spadix about 6 dm. long aside from peduncle, whitish and puberulent; rachillæ strongly ascending, slender, 3–5 dm. long, alternately fertile the whole length: fruit ovoid-oblong to rotund-oblong, 4 cm. long including the stout short angled beak, about 2.5 cm. thick, sometimes slightly narrowed to base, cupule prominent, with appressed lobes, mostly 1-loculed but sometimes with 2 cells, usually bulged or fuller on one side and more or less flattened on the other due apparently to the development of one locule and failure of the other one or two.

Coastal plain on lowish land, Demerara, British Guiana, South America, between Georgetown and Atkinson Field, *Bailey 417;* conspicuous for the laden clusters, the fruit hanging on long white strands. On the street in Georgetown I have purchased yellowish-brown oily fresh fruits of what is apparently a different but similar species sold under the name "Awarra," said to have come from "the interior" and eaten by children even though the flesh is meager. There is an *Astrocaryum Awarra,* deVriese, to the identity of which I may return at a later day.

Paramaca star-nut

In 1839 Splitgerber collected a palm in Surinam known to the Indians as Paramaca. Fragments were sent to Martius who described it in 1845 and again in 1847 as *Astrocaryum Paramaca,* saying that the termination *maca* in Arawak had reference to the spines. In the index to Oswald de Kerchove de Denterghem's attractive book, Les Palmiers, published in Paris in 1878, "*Bactris paraensis,* Splitg." is listed and it is assumed by later authors that the name is a synonym for *Astrocaryum Paramaca,* but

56. ASTROCARYUM ACULEATUM, ×1, of the Demerara region; from the trees in Fig. 54.

Martius does not mention it and Splitgerber got his Astrocaryum in Surinam not in Para, Brazil. Other binomials from other countries have been referred to *Astrocaryum Paramaca* but I am not sure of them, and I therefore keep my account simple in the hope that thereby it may be the more understandable. *Astrocaryum Paramaca* has never been botanically illustrated or even described in modern time, and I now make good on that deficiency.

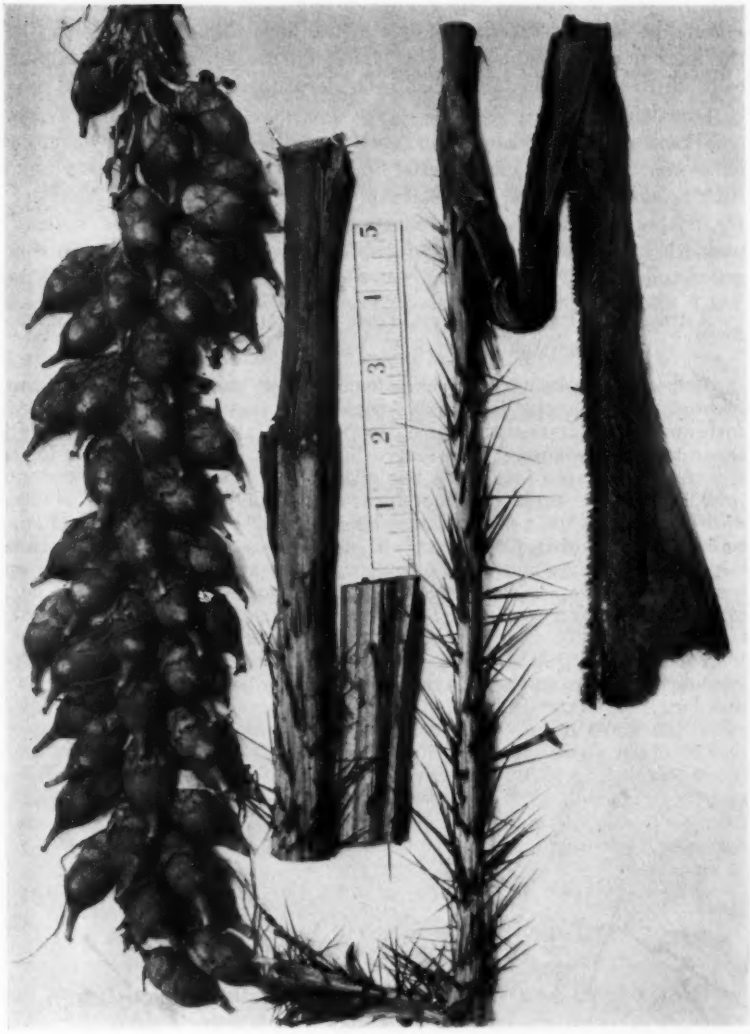
I have good material of the Paramaca palm, from which I draw the following diagnosis. This material was sent to me by Professor Gerold Stahel taken at Zanderij in Surinam (Dutch Guiana, South America). Dr. Stahel indicates that the collection was made by "Baptist, indian," with whom it has been my satisfaction to have had relationship in that interesting land.

Astrocaryum Paramaca, Mart. Hist. Nat. Palm. iii, 287 (1845); Palmetum Orbignianum, 88 (1847). Figs. 57, 58.

Recorded as acaulescent: leaves long-pinnate, shining green, nude and glabrous above, cinereous and minutely aciculate and somewhat furfuraceous underneath; pinnæ opposite or alternate, conspicuously separated, linear-lanceolate, strongly many-ribbed, 1 m. and more long, 2–3 cm. broad, apex long-acute but not filiform, bearing no long or stout prickles, margins nude to remotely aciculate; midrib triangular, glossy, mostly nude: spathe 1 m. and more long, gradually long-pointed, 6–8 cm. broad, densely and deeply covered with dark brown hair-like soft tomentum with which a few spines may arise toward the apex; peduncle nearly or quite 1 m. long, cylindric or nearly so, thickly armed with spines 3–6 cm. long; spadix a simple cylindric long-peduncled loosely spinose axis 4–6 dm. long that is thickly studded with very slender ascending rachillæ 5–10 cm. long that bear a pistillate flower near base, the sterile post-floral end extending alongside and sometimes beyond the ripened nut: fruit narrow and long, with extended straight or slightly curved beak, nearly parallel sides, the whole 4–5 cm. long and 2 cm. thick, minutely aciculate at least on the upper part, basal cup of corolla and calyx closely appressed and often 2 cm. long and subtended at bottom with spines of the pedicel, endosperm a thin shell more or less minutely aciculate or roughened, micropyle with radiating lines; seed single, filling the cavity of the endosperm, albumen homogeneous but soon splitting.

5. THE BEWILDERING GRIS-GRIS: BACTRIS, THE BACTRIDS

The extensive genus Bactris is commonly considered to be one of the torments of palm students. This prejudice is largely because there are some 200 species and many of them are superficially much alike, and also the fact that collectors do not like to attack them because of their abundant



57. ASTROCARYUM PARAMACA, ×⅓. Part of fruiting spadix with peduncle, base of petiole. Surinam.

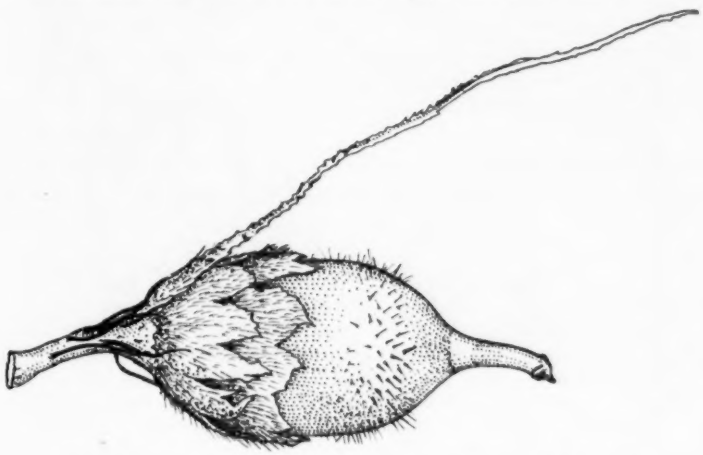
spines, and good specimens are therefore not abundant. Intrinsically, however, the bactrids are not particularly difficult, and one does not need to know all the species in order to understand those of a special territory, inasmuch as the distribution of them is regional. The genus is occidental, occurring as far north as Cuba.

In the present instance, only a few novelties have come in, and they are reported here. With the exception of *Bactris demerarana*, the following account is written entirely by Dr. H. E. Moore.

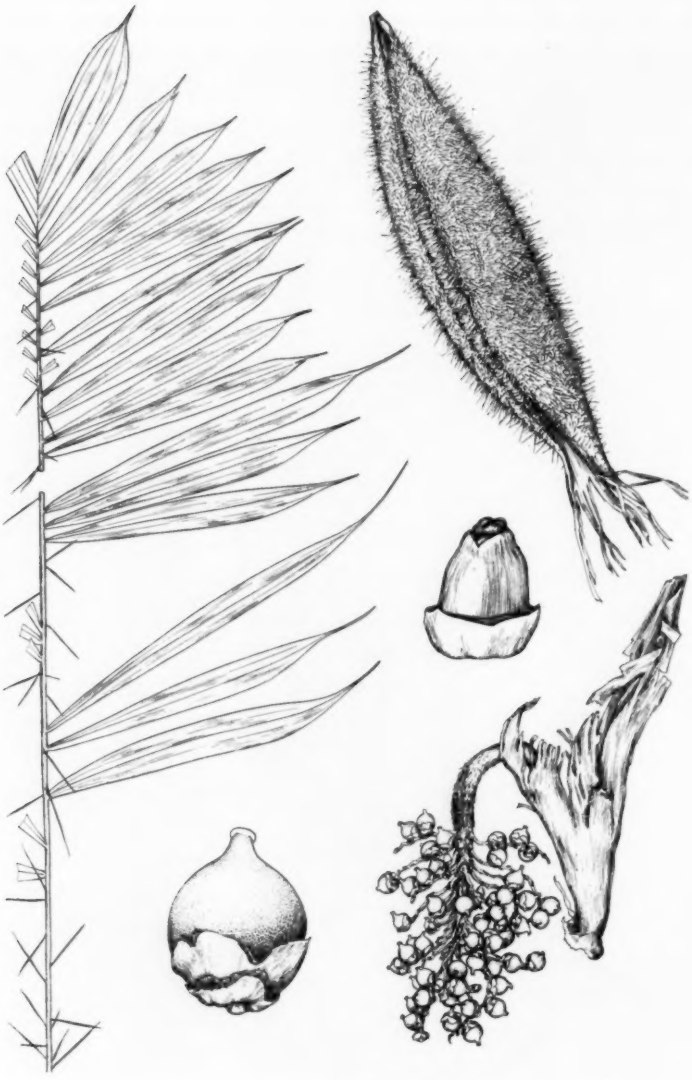
† **Bactris Baileyana,** H. E. Moore, spec. nov. Fig. 59.

Arbor gracilis, spinosa, coloniata, ad 3.3 m. alta: folia interrupte pinnata, petiolo spinoso, rachi 14.5 dm. longa, pinnis supra glabris, subtus pallidioribus et minute albo-puberulis, lanceolato-acuminatis, apice bidentatis, marginibus setosis, utrinsecus 21–22, inferioribus in gregibus dispositis, superioribus alternis, 48–63 cm. longis, 3–5 cm. latis nervis primariis singulis præter unum jugum terminale latius et brevius 3–4-nervatum: spadix 60–70-ramosus, pedunculo 15 cm. longo, recurvato, superne lepidoto-tomentoso et setoso, spathis duabus, spatha exteriore 18 cm. longa, 2.5 cm. lata, spatha interiore 30 cm. longa, 5.5 cm. lata, fusiformi, fornicata, dense spinosa, rachi 10 cm. longa, rachillis 4–8 cm. longis; flores ad rachillam irregulariter dispositi: fructus (immaturus) 1 cm. longus, ovoideus, rostratus, glaber, corolla bis longiore quam calyce in fructu, cupula staminodiali nulla.

Caulescent, spiny, soboliferous, averaging 6 canes to a clump, to 3.3 m. high: leaves interruptedly pinnate; petiole fulvous and densely ferrugineous-furfuraceous, armed with flattish, thick- and pale-based, ascending



58. Astrocaryum Paramaca, ×1½, with sterile end of the rachilla.



59. Bactris Baileyana. Left, parts of leaf-blade and petiole ×1/9; upper right inner spathe; lower right, spadix ×1/3; right pistillate flower ×4; bottom fruit ×3.

or spreading, shining black spines 3.5–7 cm. long, 1–1.5 mm. wide; rachis 14.5 dm. long, greenish and densely to sparsely ferrugineous-furfuraceous; pinnæ dull gray-green and glabrous above, paler and minutely white-puberulent on the surface below, soft and thin, lanceolate, bidentate to undivided and acuminate at the apex, the margins black setose toward the apex, the upper margin narrowly ferrugineous-furfuraceous on the lower surface, 21–22 on each side of the rachis, the lower 11–12 in alternate groups of (2)–3–(4), the upper 10–12 alternate and evenly distributed, spreading and directed forward or some of the lower divaricate and directed backward, 48–63 cm. long, 3–4 cm. wide with 1 primary nerve and 4–5 secondary nerves on each side except the oblanceolate 3–4-nerved terminal pinnæ measuring 28–32 cm. long, 6–6.5 cm. wide: spadix 60–70-branched; peduncle 15 cm. long, recurved, lepidote-tomentose, densely reddish setose at the apex; spathes 2, the outer 18 cm. long, 2.5 cm. wide, two-edged, fulvous, striate, the inner 30 cm. long 5.5 cm. wide, fusiform, acute, fornicate, densely brown-lepidote-tomentose with numerous slender crimped bulbous-based tawny to reddish spines; rachis 10 cm. long, tomentose and setose; rachillæ 4–8 cm. long, 1–2 mm. wide, tomentose and setose, at least basally; flowers irregularly disposed as indicated by scars, the staminate not seen, the pistillate with very young fruit, calyx cupular, about 2 mm. high, shallowly 3-lobed, glabrous, corolla urceolate, about 4 mm. high, 3-lobed, glabrous, staminodial ring absent: immature fruit greenish, about 1 cm. long, beaked, glabrous and striate, the cupule often excentric, exocarp softly fibrous, mesocarp and endocarp not mature.

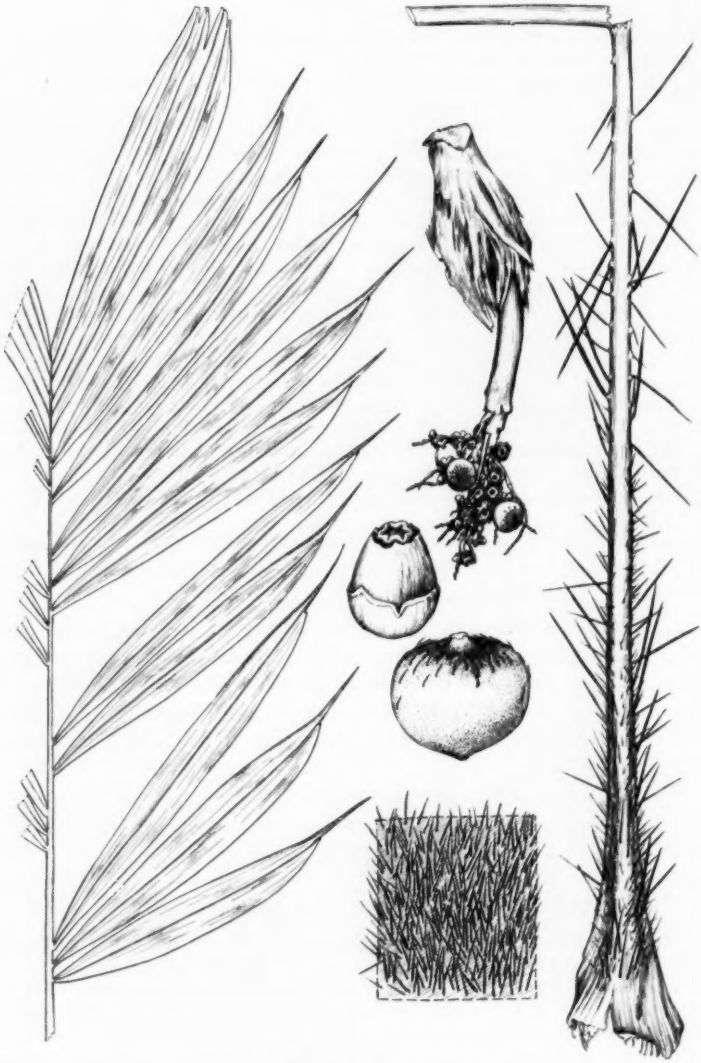
Panama, Province Chiriqui: frequent in heavy forest, Cerro Galera Chorcha, vicinity of Gualaca, altitude 1000 feet, August 1, 1947, *Paul H. Allen 5023* (Herb. Mo. Bot. Gard.).

In the Flora of Panama this species keys to *B. superior*, Bailey, from which it differs in smaller size, the fewer and grouped pinnæ, shorter inner spathe with crimped pale bulbous-based spines and 3-lobed perianth. In foliage aspect it is close to *B. Porschiana*, Burret, from which it differs in the lobed fruiting perianth with the calyx half as long as the corolla and the armed leaf-rachis.

The epithet honors Dr. Liberty Hyde Bailey whose studies in Bactris have done much to clarify our knowledge of the genus and whose name is closely associated with the palms of Panama.

† **Bactris devia,** H. E. Moore, spec. nov. Fig. 60.

Planta acaulis vel breviter caulescens: folia interrupte pinnata, petiolo 1.2 m. longo, ad basin spinoso, rachi 14.3 dm. longa, inermi, pinnis lanceolatis, apice bidentatis et acuminatis, utrinsecus 15–17, plerumque in gregibus alternis dispositis, 38–45 cm. longis, 3.3–4.6 cm. latis nervis primariis singulis præter unum jugum terminale latius 4–5-nervatum: spadix ca. 30-ramosus, pedunculo 13 cm. longo, spathis duabus, exteriore 10 cm. longa, 4 cm. lata, interiore 4.5 cm. lata, dense nigro-spinosa, rachi 7.5 cm. longa, rachillis 2–5 cm. longis: fructus turbinatus breviter rostratus 15



60. BACTRIS DEVIA. Left, part of leaf-blade ×1/6; right petiole and spadix ×1/3; pistillate flower ×4; fruit ×1½; bottom detail of inner spathe ×1.

mm. longus, 15 mm. latus, apice nigro-aculeatus, calyce et corolla in fructu plus minusve profunde trilobatis, corolla bis longiore quam calyce, cupula staminodiali nulla.

Acaulescent or short-stemmed: leaves about 9, interruptedly pinnate; petiole 1.2 m. long, densely ferrugineous-lepidote, armed in the lower third with stout, dull black, rounded, ascending to recurved spines; rachis 14.3 dm. long, unarmed, ferrugineous-tomentose dorsally, sparsely lepidote to glabrous ventrally; pinnæ lanceolate, bidentate with the lower tooth produced in a slender tip 6–17 cm. long or entire and acuminate at the apex, gray-green, glabrous and somewhat glossy with numerous transverse nervelets above, gray-green and glabrous below except the ferrugineous surface of the upper margin, the margins setose above the middle, 15–17 on each side of the rachis in alternate groups of 1–3 at intervals up to 25 cm., 38–45 cm. long, 3.3–4.6 cm. wide and 1-nerved except the broader 4–5-nerved terminal pair 6.5–7.5 cm. wide and 7.5–9 cm. along the rachis: spadix about 30-branched; peduncle 13 cm. long, brown lepidote-tomentose and very sparsely setose; spathes 2, the outer 10 cm. long, 4 cm. wide, two-edged, densely brown-lepidote-tomentose and sparsely black-setose, the inner fragmentary, that portion seen about 16 cm. long, 4.5 cm. wide, fulvous and more or less densely appressed black-spinose with crimped acicular spines 4–7 mm. long; rachis 7.5 cm. long; rachillæ 2–5 cm. long; flowers in 3's below, staminate above, the staminate not seen, the pistillate in young fruit, calyx cupular, glabrous, 2 mm. high, corolla urceolate, glabrous, eciliate, 4 mm. high, staminodial ring absent: fruit turbinate, short-rostrate, about 15 mm. high, 15 mm. wide, black-aculeate toward the apex; fruiting perianth glabrous, calyx and corolla 6-lobed, lobes often shallowly toothed, exocarp thin, fibrous, endocarp osseous and thickish.

Colombia, Vaupes, Rio Cuduyari, January 20, 1944, *Paul H. Allen 3255* (Herb. Mo. Bot. Gard.).

Bactris devia is closely related to a group of Brazilian short-stemmed or acaulescent bactrids with interruptedly pinnate leaves including *B. tarumanensis*, Barb.-Rodr., *B. exscapa*, Barb.-Rodr., *B. humilis*, Wallace, *B. Mindellii*, Barb.-Rodr., *B. interrupte-pinnata*, Barb.-Rodr. and *B. microcalyx*, Burret. From the first it differs in having the corolla twice as long as the calyx, not equal, and from the remainder in the unarmed rachis and generally fewer pinnæ. It is impossible to contrast color or texture of the foliage from plates but this species is distinctive in its pale gray-green leaves with numerous transverse veinlets and ferrugineous line along the lower surface of the upper margin, in this respect very similar to *B. interrupte-pinnata* as illustrated in Sertum Palmarum, ii, t. 7 (1903).

The epithet is taken from its location in Colombia, somewhat apart from the area of related species, most of which are from the Rio Negro region of Brazil. At present this also appears to be the only species with aculeate fruit known from Colombia.

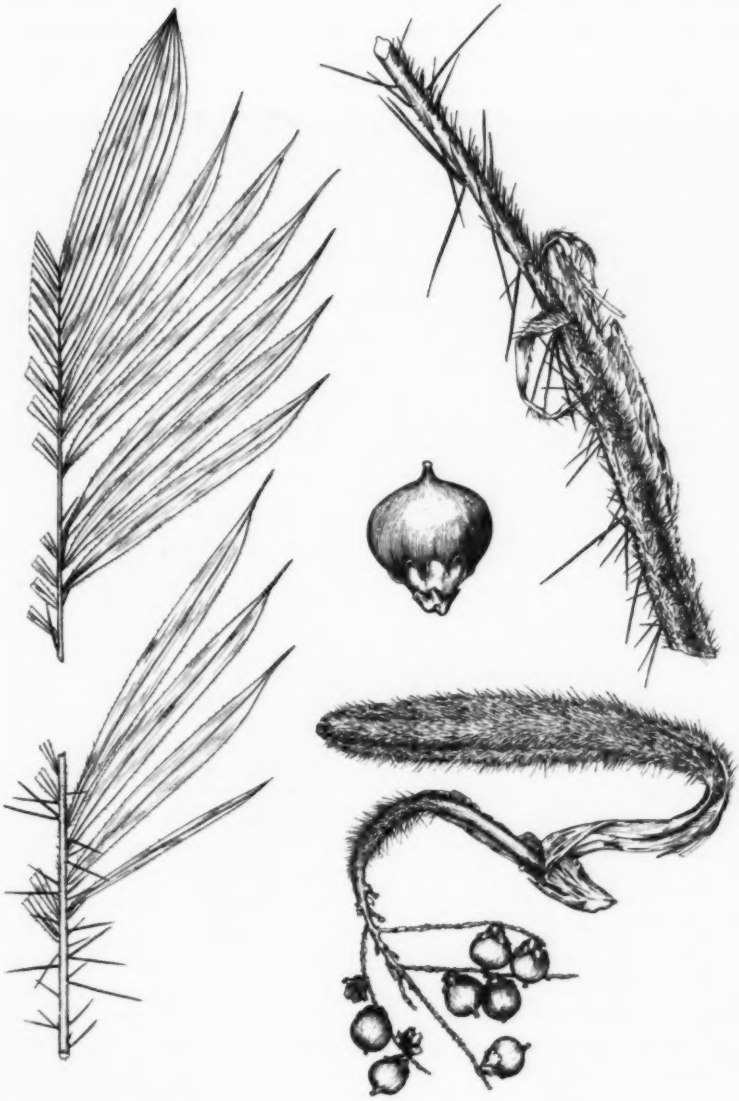
† **Bactris duplex,** H. E. Moore, spec. nov. Fig. 61.

Arbor coloniata ad 5 m. alta, caulibus 3.5 cm. crassis: folia interrupte pinnata; petiolo et vagina armatis, rachi 96 cm. longa, in dorso spinosa; pinnis linearilanceolatis, caudatis, utrinsecus 21–22 in gregibus plus minusve oppositis dispositis, 27–38 cm. longis, 2–3 cm. latis nervis primariis singulis præter unum jugum terminale 7–8-nervatum ad 6.5 cm. latum: spadix 15-ramosus, pedunculo 16 cm. longo superne aculeato et recurvato, spathe interiore fusiforma, fornicata, 20 cm. longa, dense spinosa et setosa, rachi 5 cm. longa, rachillis 8 cm. longis; flores ad rachillam irregulariter dispositis: fructus turbinatus, 16 mm. longus, 16 mm. latus, glaber, rostratus rostro 3–4 mm. longo, calyce et corolla in fructu profunde trilobatis, corolla bis longiore quam calyce, cupula staminodiali nulla.

Caulescent, soboliferous in clumps of 10–40 canes about 5 m. high, 3.5 cm. thick: leaves 5–7, interruptedly pinnate; sheath about 50 cm. long, tawny-tomentose below, becoming glabrescent above, sparsely armed with long, stout, black, often pale-based spines up to 6 cm. long and densely armed with shorter often paler spines up to 3 cm. long; petiole about 22 cm. long, green, glabrescent, moderately armed with short and long spines; rachis about 96 cm. long, glabrescent and armed with stout black spines and short aculeæ dorsally, glabrescent and aculeate ventrally, the aculeæ prominent about the bases of the pinnæ; pinnæ linear-lanceolate, caudate, dull dark green, 21–22 on each side of the rachis in more or less opposite groups of (2)–3–5 at intervals of 6–10 cm., 27–38 cm. long, 2–3 cm. wide with 1 primary nerve except the broader 7–8-nerved terminal pair up to 6.5 cm. wide and 10 cm. along the rachis, the margins paler and black-setose: spadix 15-branched; peduncle 16 cm. long, aculeate and recurved at the apex; spathes 2, the outer fragmentary, unarmed, about 10 cm. long, the inner fusiform, acuminate, 30 cm. long, 3 cm. wide on an unarmed manubrium 10 cm. long, densely appressed to spreading spinose with flattish blackish-brown spines and acicular yellowish setæ; rachis 5 cm. long, rachillæ 8 cm. long; flowers irregularly disposed as evidenced by scars: fruit glabrous, striate, turbinate, about 16 mm. long, 16 mm. wide, rostrate with a beak 3–4 mm. long, the cupule glabrous, striate, deeply 3-lobed, the lobes often toothed, the calyx about 5 mm. high, the corolla about 10 mm. high, staminodial ring absent, exocarp thin, strongly fibrous, mesocarp adherent to the osseous endocarp.

Colombia, Vaupes, road to San Martin, vicinity of Rio Ocoa, October 25, 1945, *Paul H. Allen 3358.*

The description of *Bactris duplex* (double-faced, deceitful) is based on specimens having an apparently mature leaf. A second collection from the same locality, *Allen 3357,* has the leaves entire and bifurcate at the apex with 33–35 primary nerves and an unarmed rachis but differs in no fundamental detail and appears to represent the juvenile leaf phase. *B. Cuesco,* Engel, and *B. chætospatha,* Mart., which may be confused with the entire-leaved form, differ in the former having 10 primary nerves in the leaf and a smaller fruit with fleshy exocarp and a shallowly lobed cupule, the latter



61. BACTRIS DUPLEX. Left, parts of leaf-blade dorsal view ×1/6; bottom right, spadix and inner spathe ×1/3; upper right, petiole ×1/6; center, fruit ×1.

having a much smaller leaf and unarmed petiole. The relationship of the species is not clear but in its several characters it appears most distinct.

† **Bactris demerarana,** spec. nov. Figs. 62, 63, 64.

Dense coloniata, erecta, 4–5 m. alta; truncus 4–5 cm. crassus, nodis fere armatus spinis ascendentibus 3–5 cm. longis: folia longipinnata, viridia utrinque; pinnæ multæ, alternatæ vel subopposítæ, linearilanceolatæ, 4–5 dm. longæ, 2 cm. latæ, apex longiacuminatus, costæ secundariæ prominentes, margines aciculati; petiolus et costa media aciculis minutis armata etiam spinis 8–12 cm. longis: spatha 3 dm. longa, spinis obsita 3–5 cm. longis et multis aciculis minutis; spadix pedunculo planato inermique; rachillæ in apice pedunculi, simplices, 10–12 cm. longæ: fructus ovoidei, 4 cm. longi cum sicci, 3 cm. diam., nudi, cupula calycis duplex, magna.

Densely coloniate strongly armed palm strictly erect to 4 and 5 m. or sometimes probably more; trunk 4–5 cm. thick, armed below nodes with upward-pointing spines 3–5 cm. long, the intermediate spaces more or less unarmed: leaves long-pinnate, minutely pubescent at least underneath under strong lens, green both surfaces although somewhat lighter colored but not silvery on lower face; pinnæ alternate or subopposite, numerous, linear-lanceolate or narrower, about 4–5 dm. long, 2 cm. broad at middle, narrow-pointed, strongly ribbed lengthwise, margins aciculate, blade otherwise unarmed; petiole and midrib viciously armed with minute more or less caducous prickles and also very sharp upward-pointing spines to 8 and 12 cm. long: spathe 3 dm. long, 4–5 cm. broad at middle, densely covered with spines 3–5 cm. long and many minute shorter ones more or less white-based; spadix soon recurved on a flattened unarmed peduncle; rachillæ branching simply from apex of peduncle without a central leader, stout, about 10–12 cm. long: fruit very large, ovoid, about 4 cm. long when dried and 3 cm. broad, apical point short and stout, double calyx-cup conspicuous with obtuse appressed lobes; seed not quite filling cavity, very hard, depressed endwise, about 2.5 cm. the long way, surface irregularly veined, center cavitous.

Coastal area of British Guiana, South America, in close big colonies along Demerara River, Province Demerara, beyond Craig Village from Georgetown, near Atkinson Field, *Bailey 419* (type), a formidable species to collect and handle.

In 1922 I collected this species at six places (numbers *570, 571, 573, 576, 578, 579*) in the Botanic Garden in Georgetown, Demerara, ticketed merely "Bactris"; whether it was native to the locus or was planted I do not know. In subsequent visits to that interesting Garden I have not noticed it at those places.

In the study of Guianian palms I have been aided by a large manuscript, "Notes on the Palms of British Guiana" compiled by C. Swabey

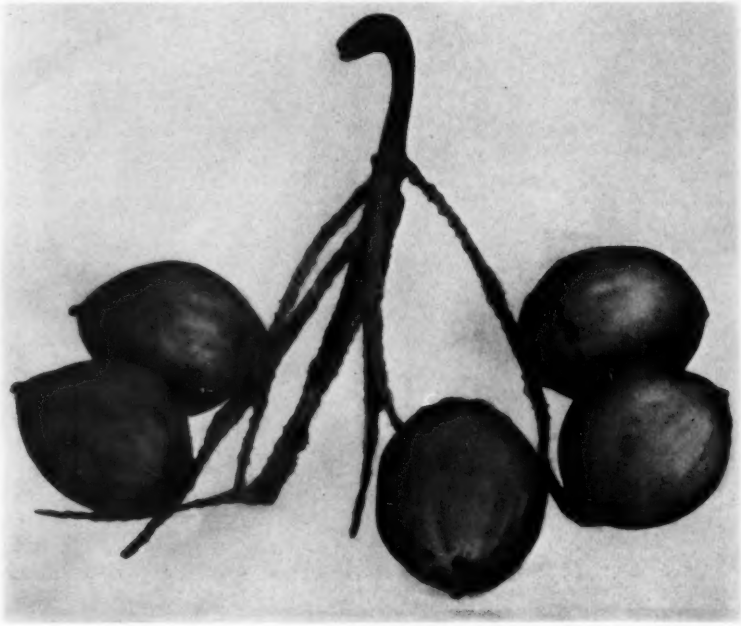
who, as a critical forest student in that country and the West Indies, has been specially interested in the palm floras and who has helped me on my journeys. (See *Bactris Swabeyi*, Bailey, in Gent. Herb. vii, page 399).

62. Bactris demeraraNA, native colony along the lower Demerara River in British Guiana, South America.

6. WEST INDIAN AIPHANES OR COYURES

Another group in which palms of the West Indies have been comfortably misunderstood is the Willdenovian genus Aiphanes (A-if'-an-ees) founded in 1804 on a collection from Venezuela, at one time referred to Martinezia of Riuz & Pavon, 1794. Three species of this genus are accredited to the West Indies: 1. *A. minima*, Burret, 1932, of Martinique, based on *Bactris minima* of Gaertner, 1791, including *Martinezia corallina* of Martius, 1845, of which to this day there is no authentic picture except of the fruits shown by Gaertner and no dependable current diagnosis. 2. *A. erosa*, Burret, 1932, the *Martinezia erosa* of Linden's Catalogue of 1871, assigned to Barbados, Grenada and St. Vincent, but which is apparently native only on Barbados. 3. *A. acanthophylla*, Burret, 1932, based on *Bactris acanthophylla*, Mart., 1845, of Puerto Rico, made *Curima calophylla*, Cook, 1901.

We now are to become acquainted with two new species currently confused with *A. erosa* but which are unmistakably distinct; on Dominica is another species of which I do not have sufficient material for acceptable diagnosis; the one reported on Grenada is yet to be worked out.



63. BACTRIS DEMERARANA. Fruit as taken fresh from the tree, about ¾ natural size.

Because of their spiniferous nature, the coyures are often confused with Bactris, but the long inflorescence not covered in a cymba-like spathe, the very different not conoid nor prominently beaked and often pitted little fruits, and broad-ended erose pinnæ at once distinguish them. They are small or under-size woods palms, often planted for ornament.

The five West Indian coyures so far described assort themselves as follows:

A. Spathe a very narrow grass-like unarmed member, the spadix small, slender and hanging on a long peduncle, with few short rachillæ: nutlet or seed not pitted.....*A. luciana*

AA. Spathe woody, flattened or cylindric, coming to a distinct point, sometimes armed; spadix a heavy structure with many rachillæ, not slenderly peduncled.

B. Pinnæ nude underneath (unless sometimes at base).

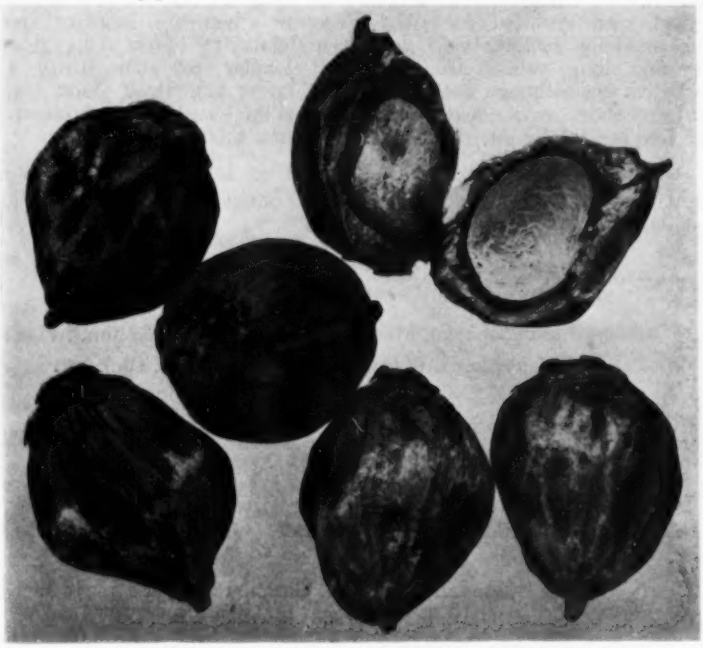
C. Nutlet or seed conspicuously pitted: pinnæ broadening toward apex.....*A. acanthophylla*

CC. Nutlet not noticeably pitted: pinnæ with nearly or quite parallel sides above the base.....*A. erosa*

BB. Pinnæ bearing prickles underneath on the veins.

C. Surface of spathe not spiniferous: nutlet or seed very veiny, not pitted.....*A. vincentiana*

CC. Surface of spathe prominently spiniferous on lower half: nutlet prominently pitted.....*A. minima*



64. BACTRIS DEMERARANA. Dried fruits, natural size.

† **Aiphanes luciana,** spec. nov. Fig. 65.

Arbor alta, ad 8 m.; truncus solitarius, 10–13 cm. diam., annulatus spinis ad 6 cm. longis, trunci annosi postremo nudi: folia circa 2 m. longa, non argentea subter, glabra; pinnæ multæ, 4–5 dm. longæ, 3–5 cm. latæ, inermes, apex oblique erosus; petiolus armatus ad basin: spatha linearis, nuda, circa 1 m. longa, pendens; spadix longus simplexque, pendens, 1 m. longus, pedunculus longus spinis gracilibus 2–4 cm. longis armatus; rachillæ graciles, undulatæ, 10–15 cm. longæ: fructus depresso-globulares, rubri, 15 mm. diam., endocarpium crassum durumque, obscure areolatum; semen 5–7 mm. diam.

Tree to 8 m. tall; trunk single, 10–13 cm. thick, with rings of upward-pointing black spines 6 cm. or less long at intervals, old boles becoming nude, roots prominent 3–6 dm. above ground: leaves pinnate, 2 m. more or less long, green both surfaces but lighter colored underneath, more or less glossy on upper face; pinnæ alternate or subopposite, 18–20 of them either side the rachis, about 4–5 dm. long, 3–5 cm. broad, apex obliquely erose with long acute finger on upper margin, unarmed, margins nude; petiole armed with slender downward-pointing spines 1–2 cm. long, this armature lessening to the first pinnæ and hardly evident beyond: spathe interfoliar, nude, linear or strap-like, nearly 1 m. long, hanging; spadix a simple slender recurving or hanging structure to 1 m. long, its very slender peduncle armed with crowded forward-pointing or divaricate hair-like spines 2–4 cm. long; rachillæ very slender, undulate, 10–15 cm. long; flowers 2–3 mm. long, yellow: fruit depressed-globular, red at maturity, said to be eatable although sarcocarp very thin, 15 mm. thick, point abrupt and very short, surface featureless, endocarp thick and hard with obscurely areolate but hardly pitted shell; seed 5–7 mm. thick.

St. Lucia, Windward Islands, British West Indies, an understory element in dense rain forests; Barre de l'Isle, *Bailey 440* (type); Piton Flore, *John Beard 484.*

Aiphanes acanthophylla, Burret, in Notizbl. Bot. Gart. Berlin, xi, 558 (1932). Fig. 66.

Bactris? acanthophylla, Mart. in Palmetum Orbignianum, 70 (1847).

Curima calophylla, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 561, t. 48 (1901).

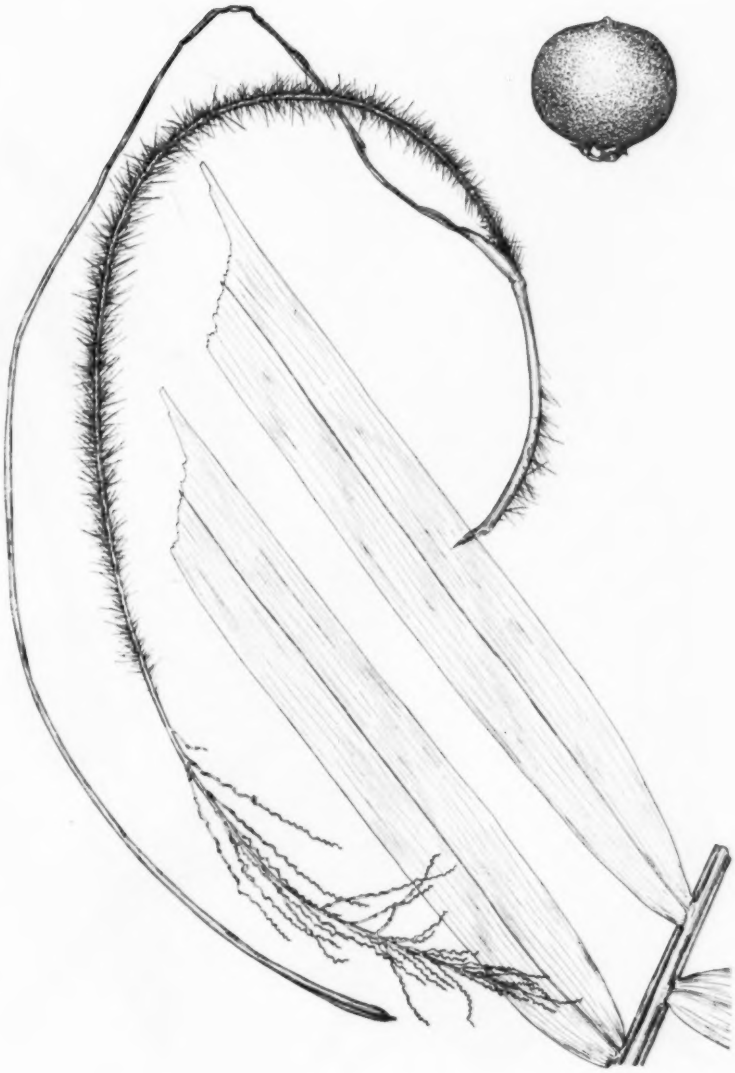
Martinezia acanthophylla, Becc. in Urban, Symb. Antill. viii, 79 (1920).

Described in Gentes Herbarum, iv, 182 (1938). Puerto Rico.

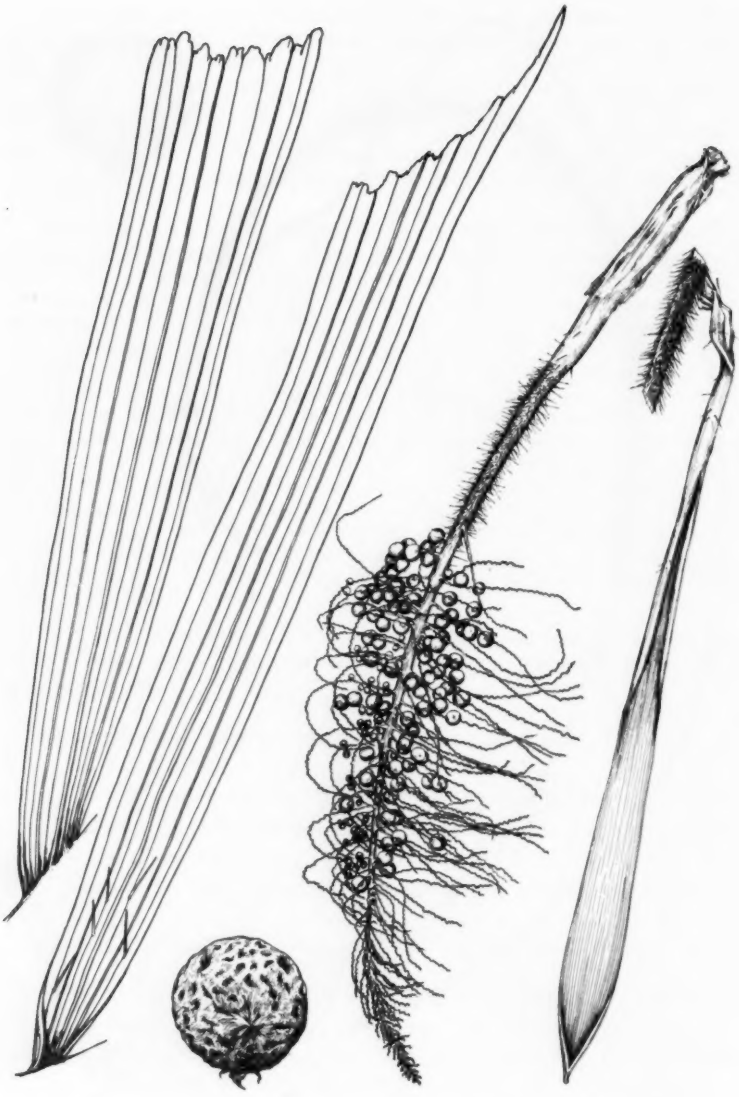
Aiphanes erosa, Burret, in Notizbl. Bot. Gart. Berlin, xi, 558 (1932). Fig. 67.

Martinezia erosa, Lind. ex Gard. Chron. 1872, page 1297; Nichols. Illus. Dict. Gard. ii, 330 (1888).

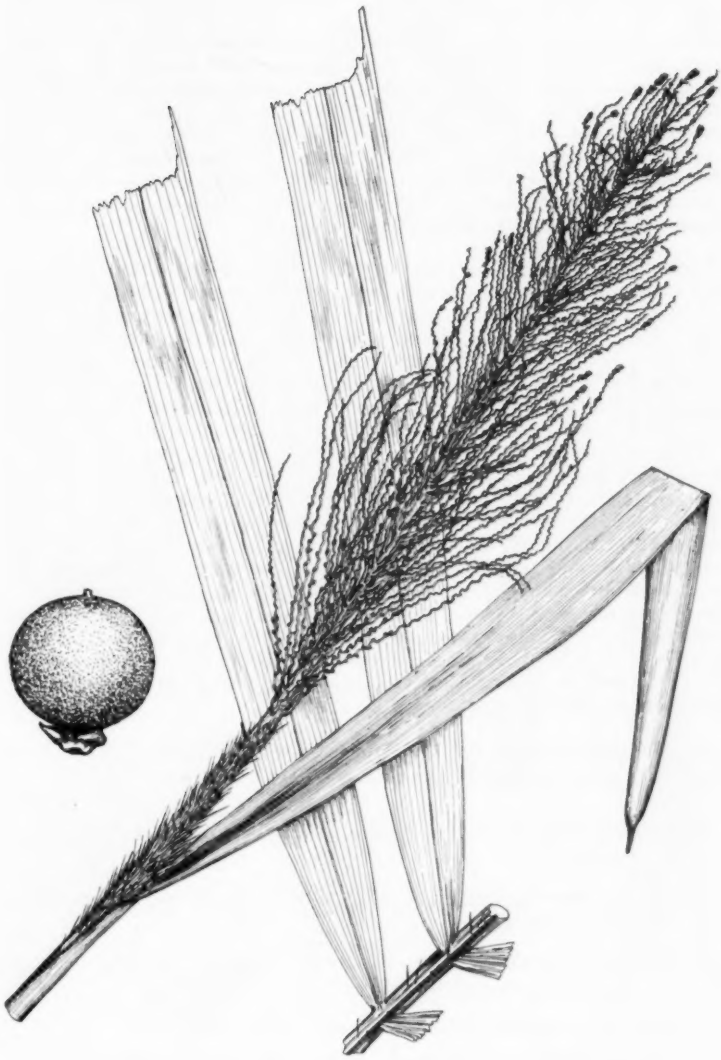
Described in Gentes Herbarum, iv, 183 (1938). Barbados.



65. Aiphanes luciana × about ⅓; fruit × nearly 2. St. Lucia island.



66. AIPHANES ACANTHOPHYLLA ×⅓, fruit ×1½ Puerto Rico island.



67. Aiphanes erosa ×⅕; fruit ×2. Barbados island.

† **Aiphanes vincentiana,** spec. nov. Fig. 68.

Truncus solitarius, 4–5 dm. diam., indefinite annulatus spinis ad 1 dm. longis: folia circa 3 dm. longa, pinnata, viridia utrinque; pinnæ 50–60 paribus, 1 m. longæ, 7–9 cm. latæ, nervi longitudinales multi, apex erosus, paucis setis brevibus subter, pinnæ terminales lineares; petiolus sparsis spinis planis 15 mm. ad 4 cm. longis, vaginæ sparse aculeatæ spinis ad 5–7 cm. longis: spatha interfoliaris, circa 1 m. longa, sparse debiliterque aculeata; spadix circa 8 dm. longus, pedunculus valde aculeatus basi; rachillæ plurimæ, longæ gracilesque, validæ sed fines filiformes: fructus pæne globulares, 14–15 mm. crassi cum sicci, aliquid fastigati ad basin et apicem, endocarpium crassum et perdurum, non areolatum, albidis maculis; semen 7–8 mm. diam., endocarpium explens.

Large much-armed palm, trunk 4–5 dm. diameter, outer part black and hard as iron, inside white and soft, ringed with rosettes of flattened spines to 1 dm. long: leaves pinnate, about 3 m. long; main pinnæ nearly or quite 1 m. long, in 50–60 pairs closely placed, glabrous and green on both surfaces, 7–9 cm. broad, bearing many strong prominent longitudinal nerves or ribs, margins smooth, apex erose with an extended finger on upper margin, with a few short prickles 1–2 cm. long on under surface, at end of leaf almost linear; petiole liberally supplied with short and long spines 5 mm.–4 cm. long and pointing downward, midrib bearing only short or minute prickles, spines on leaf-sheath often 5–7 cm. long and conspicuously flat: spathe long and narrow, 1 m. or so in length, only sparsely weak-prickly; spadix about 8 dm. long and peduncle 5–6 dm. long, very thorny at base but nude toward apex; rachillæ very many, long and slender but strongest fertile ones 2–3 mm. thick when dry, the ends filiform, fruit-pits shallow and small: fruit nearly globular, vermillion in color at maturity, 14–15 mm. thick when mature and dry, a trifle longer including the very brief beak and often slightly tapered base, surface featureless, very hard with a thick shell that inside the outer wall is not pitted but marked with light colored flecks; seed filling the interior cavity, homogeneous, about 7–8 mm. thick.

Cumberland Valley, St. Vincent, Windward Islands, British West Indies, in forests, woodlands and thickets, *John Beard 230.*

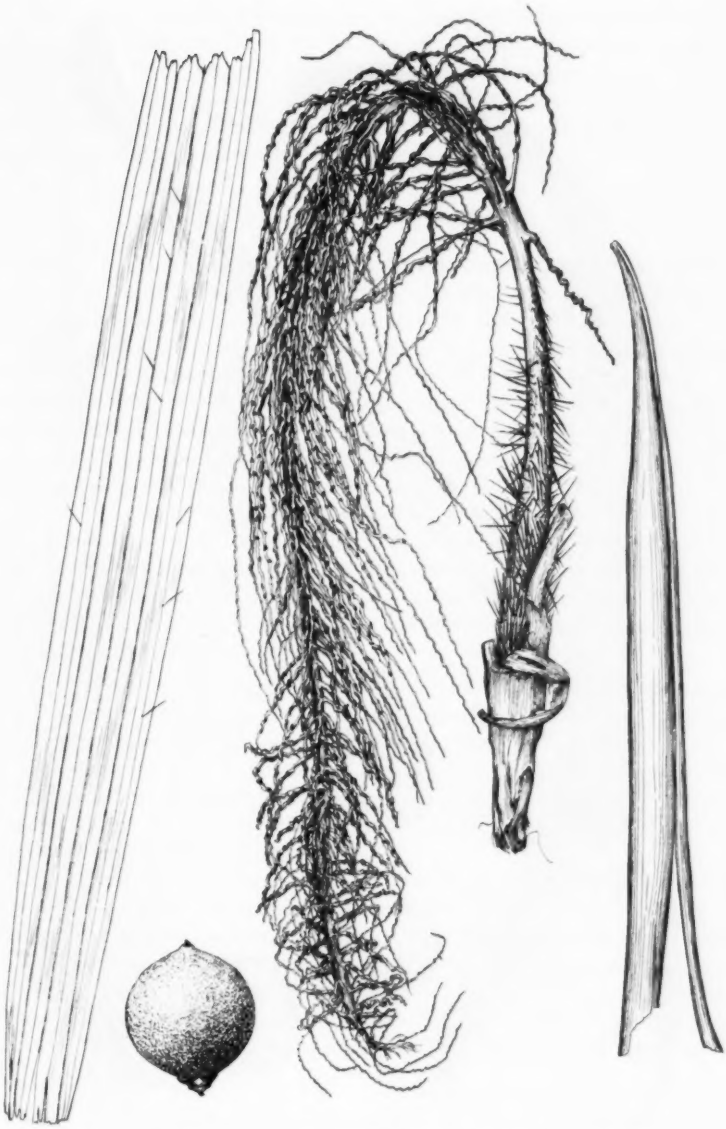
Aiphanes minima, Burret, in Notizbl. Bot. Gart. Berlin, xi, 558 (1932). Fig. 69.

Bactris minima, Gaertn. Fruct. et Sem. Pl. ii, 269, t. 139 fig. 5 (1791), excl. syn.

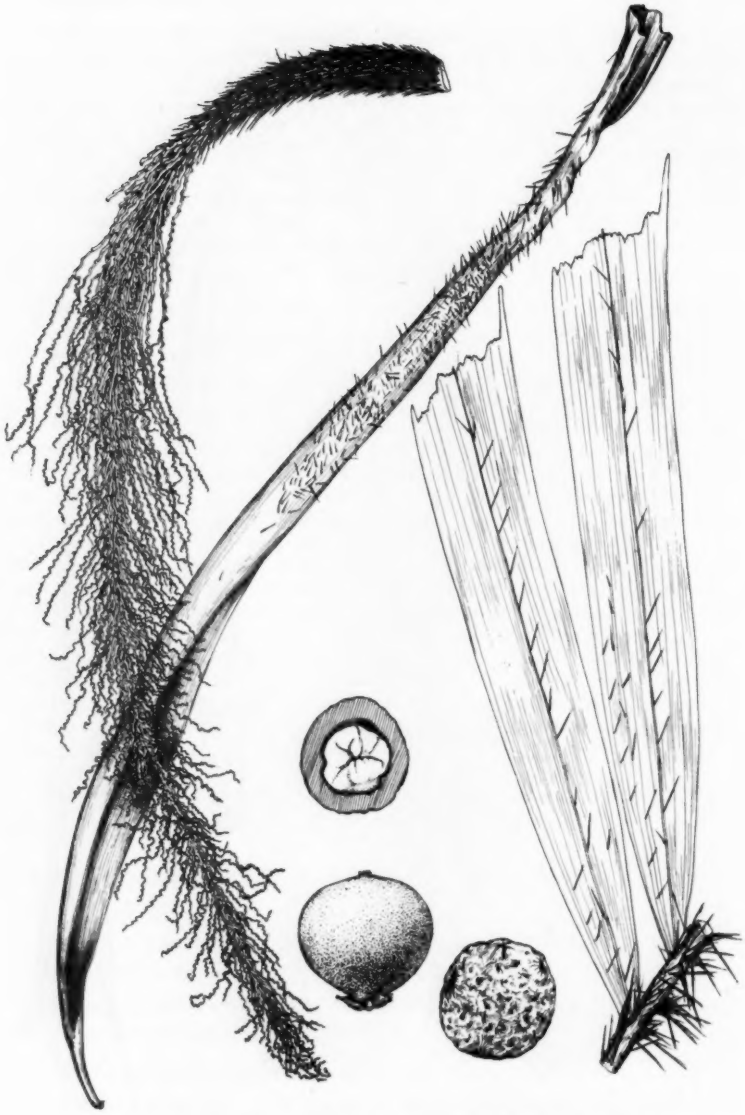
Martinezia corallina, Mart. Hist. Nat. Palm. iii, 284 (1845); Palmetum Orbignianum, 76 (1847).

Aiphanes corallina, Wendl. in Kerch. Palm. 230 (1878).

Curima corallina, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 563 (1901).



68. Aiphanes vincentiana ×⅓; fruit × nearly 2. St. Vincent island.



69. Aiphanes minima ×⅓; fruit × nearly 2. Martinique island.

Martinique. There is still doubt as to the nativity of this palm. Burret assigns it to high woods on Martinique at altitudes of 300–600 meters. Père Duss in Flore Phanérogamique des Antilles Françaises, 490 (1897) records it about habitations on Martinique and states that it is introduced and naturalized from Brazil. I have not found it in the wild on Martinique, and my account is drawn from planted trees.

7. THE YU-YU PALMS: YUYBA

Bactris is a confused genus because it is so large in species and also so numberless in individuals and therefore variable, even though it is not extraordinarily difficult if one has good material and does not assume that a species may grow in any region. Efforts to clarify the genus by dividing it are three: Augustinea, Pyrenoglyphis, by Karsten; Amylocarpus by Barbosa-Rodrigues. The two former divisions do not expedite the genus. Amylocarpus appears to be a defendable separation and it is evident on general appearance as well as in technical characters. It was accepted by Drude, careful student of palms, although later reduced by Burret.

So far as I know them the yu-yus are distinguishable on sight. Probably other separations should be made to simplify treatments of Bactris. We may need a revised approach to that genus. Unfortunately, the name Amylocarpus is antedated. Therefore, in my Trinidad-Tobago paper, Gentes Herbarum, vii, 413, I found a new name in Yuyba which for my own comfort I pronounce Yuee-ba.

Six species are now named in Yuyba, the Amylocarpus occurrences of Barbosa, excepting one, not having been transferred inasmuch as I have not been studying particularly the palms of Brazil. Two of the six are *Y. simplicifrons* and *Y. trinitensis* of the Trinidad-Tobago paper, and *Y. Maguirei, Y. Stahelii, Y. dakamana, Y. essequiboensis* of the Maguire Guiana paper (Bull. Torr. Bot. Club, Jan.-Feb. 1948). We are now to look at the assemblage again.

The Yuybas are simple slender nude palms or with only small prickles, not spines, on some of the parts, lacking the projecting floral organs of Bactris, sheaths on the boles short or undeveloped; spathe not a covering cymba-like organ but very narrow and not pedunculate and little extended from the sheath; spadix not protruded on a peduncle, either a simple unbranched axis 2 dm. or less long or perhaps with two or three short branches; fruit very small and commonly unarmed, not bactris-like in appearance.

† **Yuyba paula,** trans. nov.

Bactris paula, Bailey, Gent. Herb. vi, 226, t. 117 (1943).

Panama, Province Coclé.

† **Yuyba Schultesii,** spec. nov. Fig. 70.

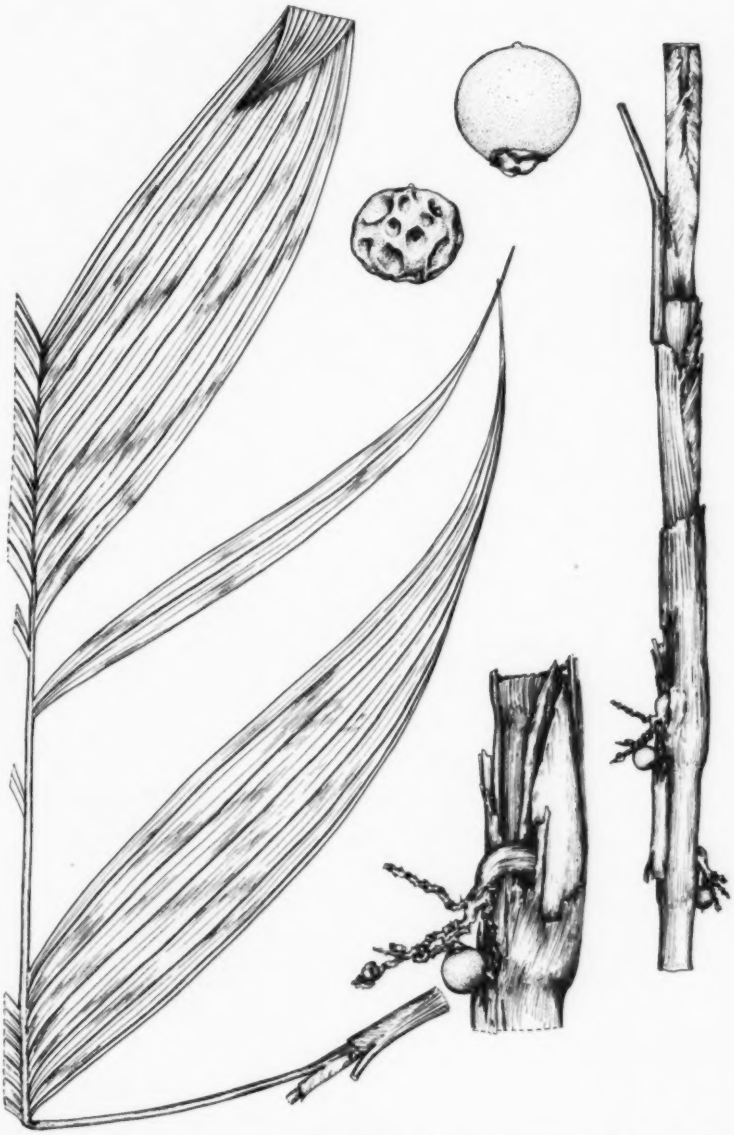
Arundinacea, inermis; truncus 1.5 cm. diam., internodia circa 13 cm. longa; petiolus viridis et furfuraceus, 15 cm. longus; rachis 37 cm. longa, sparse furfuracea; pinnæ lanceolatæ et falcato-caudatæ, fusco-virides et glabræ supra, tenuiter pallidores et glabræ et postremum minute puberulentæ vel hispidulosæ subter, 3–4 utrinque 15–16 nervis primariis, nervus basalis 42–44 cm. longus, 5.7–6.7 cm. latus, 5-nervatus, nervus intermedius 33–35 cm. longus, 1.5–2 cm. latus, 1-nervatus, nervus terminalis 22 cm. longus, 12–14 cm. secundum rachim, 8–9-nervatus: spadix 4-ramosus, brevissimus rachi sola ex vagina exserta; rachillæ ad 2 cm. longæ; flores terni saltem subter: fructus globosi, flavi, 8–10 mm. diam., cupula 3-lobata, corolla vix calycem excedens.

Small and unarmed; trunk arundinaceous, 1.5 cm. thick, brown and glabrous below the spadices, sheathed with leaf-bases above, the internodes about 13 cm. long: sheath about 14 cm. long, densely brown-lepidote below, becoming glabrescent above; petiole 15 cm. long, green and more or less densely furfuraceous; rachis 37 cm. long, green and sparsely furfuraceous; pinnæ 3–4 on each side, linear to lanceolate and falcately tapered to an acuminate apex, margins minutely setulose apically, dull dark green, soft and glabrous above, slightly paler and glabrous to minutely puberulent or hispidulous, especially on the veins, below with 15–16 primary nerves on each side and 1–3 secondary nerves between the primaries, basal 42–44 cm. long, 5.7–6.7 cm. wide, 5-nerved, the intermediate 33–35 cm. long, 1.5–2 cm. wide, 1-nerved, terminal 25 cm. long, 12–14 cm. along the rachis, 8–9-nerved: spadices small, 4-branched; peduncle 3.5–4.5 cm. long, puberulent or glabrous, abruptly recurved at apex and scarcely exserted from leaf-sheath; outer spathe included, about 7.5 cm. long, 1.2 cm. wide, flattened and somewhat two-edged, smooth, inner not seen; rachis scarcely evident or up to 7 cm. long; rachillæ up to 2.5 cm. long, 1.5 mm. thick, glabrous to puberulent; flowers in 3's below or nearly throughout as evidenced by scars: fruit globose, glabrous, striate, yellow when dry, 8–10 mm. diameter; fruiting calyx glabrous, about 1.5 mm. high, 3-lobed, corolla irregularly lobed, lobes mucronulate and sometimes ciliate, scarcely exceeding calyx, exocarp very thin, fibrous, mesocarp thin and somewhat pulpy, endocarp thin, smooth, pale, with 3 micropylar pits.

Colombia, Putumayo, Rio San Miguel o Sucumbios, Conejo y los alrededores en frente de la Quebrado Conejo, altitude 300 meters, *R. E. Schultes 3519.* Dr. Schultes' collections from Colombia have added measurably to the palm flora of the country and it is with pleasure that his name is associated with the species.

† **Yuyba Gleasonii,** spec. nov. Fig. 71.

Erecta, gracilis, pæne 2 m. alta, inermis, glabra; caudex 1 cm. diam., vaginæ 5–12 cm. vel plus longæ: folium 2 paribus sigmoideorum, latorum segmentorum et 1 intermedio segmento angusto; segmenta terminalia 18 cm. longa, 6–7 cm. lata, acuminata, valde 6-costata, segmenta basalia



70. YUYBA SCHULTESII ×⅓, spathe and spadix at bottom nearly natural size, fruit ×2.

angustiora acutioraque, late conjuncta basi: spatha una, pæne linearis, maculata cum sicca, 6–8 cm. longa; spadix simplex, rectus, 4–5 cm. longus, prominens pedunculus 1 cm. longus.

Slender, erect, to nearly 2 m. tall, dry bole 1 cm. thick between sheaths, glabrous, unarmed; sheaths 5–12 cm. or more long, strongly nerved lengthwise; leaf-blade about 2.5 dm. long and somewhat broader, sigmoidly segmented to the midrib; segments 2 terminal and 2 basal with another single narrow segment between, upper pair each 18 cm. long and 6–7 cm.

71. Yuyba Gleasonii ×⅗. Upland bush palm in British Guiana.

broad, pointed but not narrowly long-attenuate with 6 strong ribs and a few thinner ones between, lower pair somewhat narrower and more slenderly pointed, broad and connected at base: spathe single at the node, nearly linear, maculate when dry, upstanding, 6–8 cm. long; spadix single and simple, straight, floral part 4–5 cm. long, visible peduncle 1 cm. long, divaricate or declined, floral pits conspicuous when flowers have fallen, pistillate flowers 2–3 mm. long, cup of blunt or nearly erose lobes.

British Guiana, South America, in dense upland bush at Kangaruma, Potaro Landing, *H. A. Gleason 220.*

This plant has been identified as *Bactris inermis*, Trail, of Brazil, from which it differs in its fewer more ribbed leaf-segments and lower segments broadly united at base, and as *Amylocarpus tenuissimus*, Barb.-Rodr., with which it contrasts in its broader more sigmoid strongly nerved segments, in much longer nearly linear spathe, simple rather than forked spadix, longer sheaths.

8. FURTHER STUDIES IN THE OCCIDENTAL CLIMBING PALMS: DESMONCUS

The outstanding problem in Desmoncus is the identity of *D. horridus.* This name was suggested in a letter from Splitgerber to Martius for a palm in Surinam and published by Martius in 1845 with very inadequate description, indicating that he did not have much material of it, if any. Since that time *D. horridus* has become a nondescript name in almost any country for a Desmoncus that could not be referred anywhere else. Thus the Dahlgren Index of American Palms attributes it to Surinam, French Guiana, Brazil, Venezuela, Trinidad, Colombia. In my paper on the Trinidad-Tobago palms in 1947 I eliminated this palm from those islands and stated that "I have good complete material of it from Surinam" and "I hope fully to describe it for the first time in a forthcoming paper"; the fulfilment is now at hand.

Author of the species, L. Splitgerber, 1801–1845, born and deceased in Amsterdam, Holland, made a botanical journey in Italy in 1833, and to Surinam in 1837–38. He is commemorated in the genus Splitgerbera of the Urticaceæ, now merged in Bœhmeria.

The only pictorial clue we have to *Desmoncus horridus* is a little drawing of the pistillate flower added to a full page colored plate of another species by Martius at the time of the original publication. This old picture is redrawn at left in Fig. 72; it shows the nearly entire corolla-cup (not deeply cleft as in many other species) holding the pistil, and spread of the interior of the cup with the staminodes. At right is a similar display from a current collection in Surinam with the staminodes on an inside view of

the corolla-cup. I think these pictures represent the same species, particularly as the contemporaneous specimens do not contradict the brief description in Martius and as the locus is correct.

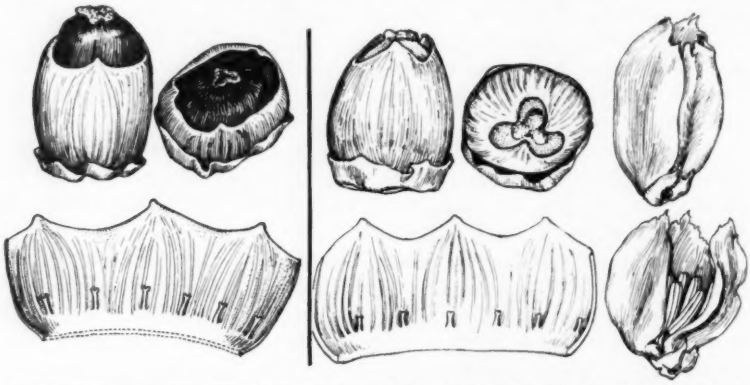
Another indication of the Splitgerber plant is photograph number 31321 of the Field Museum of Natural History of an herbarium sheet in Vienna with the apparent approval of Martius as *D. horridus*. It is a leaf section with spiniferous rachis and three little pieces of rachillæ. These pinnæ fairly well meet the original diagnosis as lanceolate, acute, base acuminate.

Specimens now in hand from three collections in the region of Paramaribo in Surinam appear to satisfy the requirements of the diagnosis and in addition to indicate that the species is variable within itself in its foliage. These abundant specimens were taken at my request by Gerold Stahel, Director of the Experiment Station and Botanic Garden at Paramaribo, who wrote me that "still there are spines in my fingers,—a horrible palm indeed."

Although the leaflets are of different shape and number in the three collections nevertheless they are otherwise comparable and the fruits as well as the armature and hooks are the same. I have noted similar differences of leafage in other species of Desmoncus. The pictures show these variations in the Paramaribo *D. horridus*, Fig. 73 lanceolate acute and in four or five pairs, Fig. 74 leaflets much narrower and in many pairs.

Desmoncus horridus, Splitg. ex Mart. Hist. Nat. Palm. iii, 279 (1845); Palmetum Orbignianum, 51 (1874). Figs. 72, 73, 74.

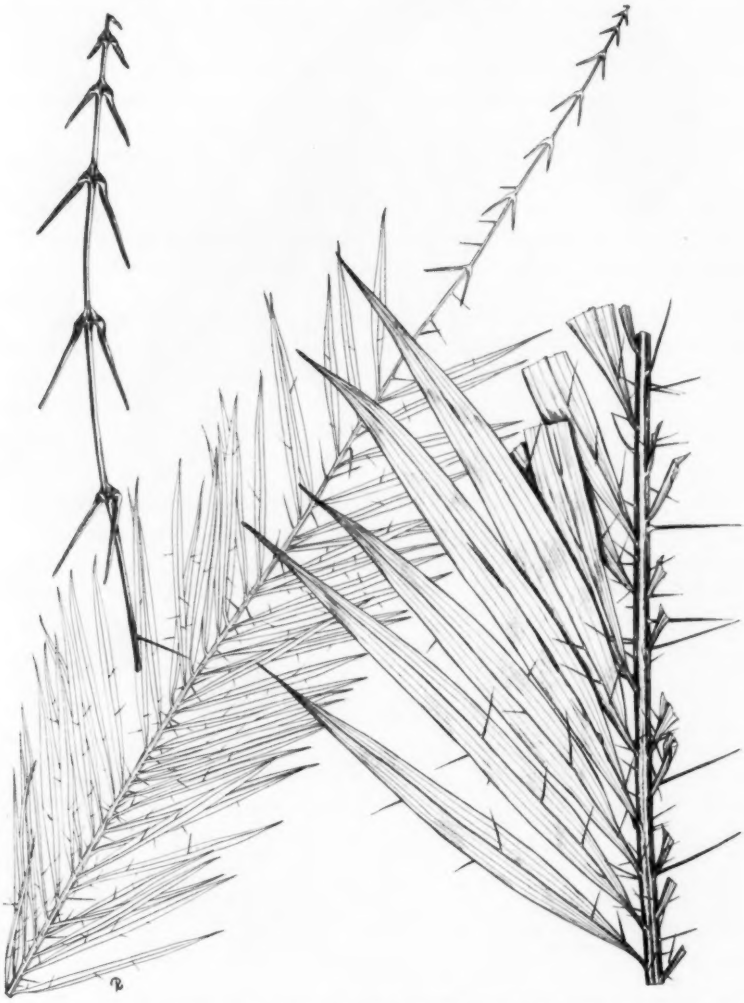
Formidable spiniferous strong glabrous climber: sheaths densely covered with very short and long spines; leaves closely long-pinnate, green on both



72. Desmoncus horridus, from Surinam. Left, detail enlarged from Martius, three items showing pistillate flower and corolla-cup inside with staminodes. Right, same parts from life ×10 and two staminate flowers ×4.

73. DESMONCUS HORRIDUS, Surinam (Dutch Guiana). Leaf-end with terminal hooks, spathe and inclosed spadix $\times \frac{1}{3}$. Fruit $\times 2$.

surfaces; pinnæ many, opposite, subopposite and scattered, linear-lanceolate to lanceolate, 3–4 dm. long, 2–4 cm. broad, with prominent parallel lateral veins, midrib on under side carrying a few prickles 1–3 cm. long; petiole and midrib with scattered white-based spines 2–5 cm. long; terminal



74. Desmoncus horridus, Surinam, South America. ×¼. Vigorous young growth with numerous and narrow pinnæ. Left, hooks from average leaf.

hooks strongly reflexed, rather weak on certain cirrhi and 2 cm. or less long, stout and stiff in other cases and 6–8 cm. long, the cirrhus either bearing spines or bare of them: spathe about 3 dm. long, 5–7 cm. broad at expansion, conspicuously covered with bulbose-based spines 5–15 mm. long; spadix simple, about 2 dm. or more long in the branching part, rachillæ many, slender, 10–18 cm. long, undulate and mostly nude, peduncle densely aciculate; flowers very small, the floral cup with entire or indefinitely pointed angles, fruit brown at dry maturity, oblong, 13–15 mm. long, 8–10 mm. thick, point very short and small, surface usually showing depressions over the 3 micropyles, shell strong; seed oblong, 1 cm. or less long, featureless except for the micropyles, 2 of which are abortive.

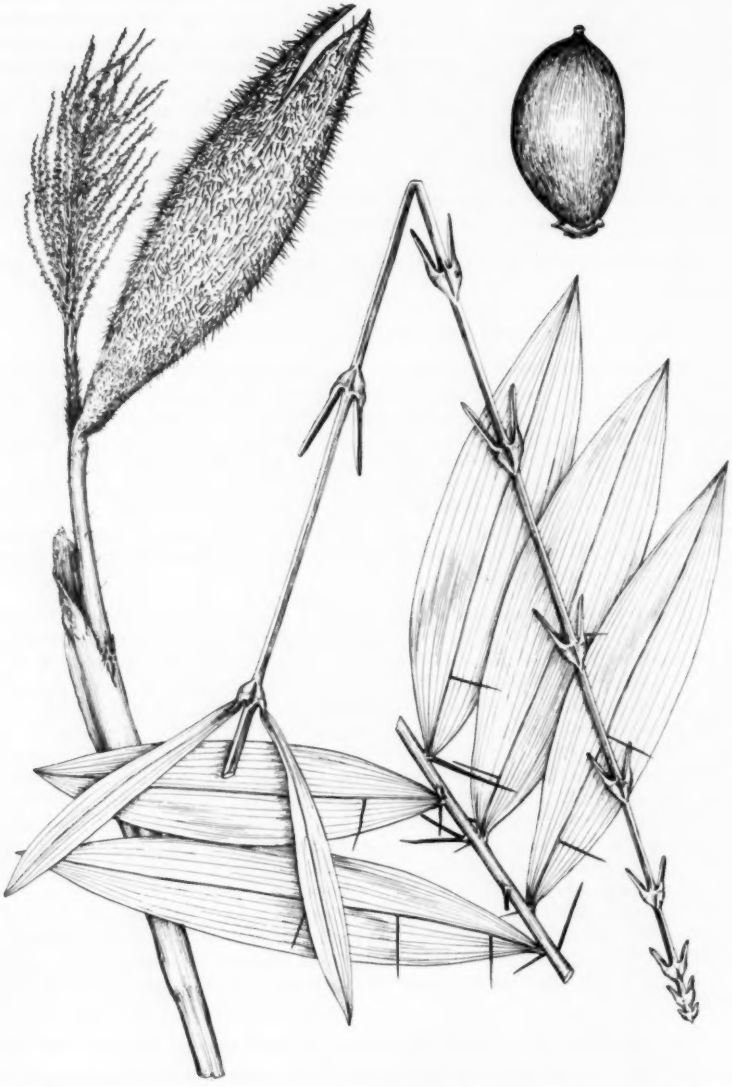
Recognized only about Paramaribo, Surinam (Dutch Guiana), South America.

† **Desmoncus demeraranus,** spec. nov. Fig. 75.

Magnus et validissimus, valde armatus, scandens ad 16 m. altus: folia magna, glabra, petiolus et costa media furfuracea spinis 2–6 cm. longis; pinnæ multæ, sparsæ vel subopositæ, 2–3 dm. vel plus longæ, 5–7 cm. latæ, acuminatæ, multicostatæ, spinis paucis subter; unci terminales 2–6 cm. longi, validi, reflexi, plani basi crassa lignosaque: spatha circa 3 dm. longa, 4–7 cm. lata, aculeata; spadix pedunculusque 2–3 dm. longus, rachillæ dense floriferæ et undulatæ: fructus rubri, oblongi, 15–17 mm. longi, 10–12 mm. lati, non conspicue acuminati, tenuiter sarcosi extra, endocarpium conchiforme et striatum; semen 12–13 mm. longum, 1 magna micropyla et 2 abortivis.

Very stout palm at first nearly erect to 3–5 m., then long-scandent to 12–16 m. in trees and on bushes: leaves long and heavy, glabrous, petiole and midrib furfuraceous, bearing many brown-black flat spines 2–6 cm. long, leaf-sheaths closely prickly; pinnæ many, scattered or semi-opposite toward the apex, broadly elliptic-lanceolate, 2–3 dm. or more long, 5–7 cm. broad, acuminate, strongly many-ribbed lengthwise, bearing 1 or few spines 3–4 cm. long on midrib underneath; terminal hooks very large and stout on a thin-edged strong rachis, 2–6 cm. long, completely reflexed, flat and centrally ridged, the woody bases much extended and thickened: spathe nearly or quite 3 dm. long, 4–7 cm. broad, profusely covered with divaricate and retrorse prickles 1–2 cm. long; spadix with peduncle 2–3 dm. long in flower, peduncle minutely aciculate, flowering part about 18 cm. long, rachillæ closely flowered and somewhat undulate, flowers 4–5 mm. long at expansion: fruit red, oblong, 15–17 mm. long when dry and 10–12 mm. thick, apical point scarcely evident, surface wrinkled but smooth, exterior sarcose but endocarp shell-like and reticulated toward the 3 pores of which 2 are functionless; seed 12–13 mm. long, albumen uniform and white.

Coastal plain in Province Demerara, British Guiana, South America, abundant on east bank of Demerara River near Craig Village between Georgetown and Atkinson Field, *Bailey 418;* a big conspicuous and dominating kamwarri, the local vernacular name of this group of palm vines.



75. Desmoncus demeraranus ×⅓. Fruit ×2. Note the very broad short-acute pinnæ and thick stout hooks.

† **Desmoncus mirandanus,** spec. nov. Fig. 76.

Glaber validus debiliter armatus scandens: folia longipinnata, petiolus et costa sparsis aculeis hamatis 4–10 mm. longis; pinnæ alternatæ, sparsæ vel oppositæ, 10–12 paribus vel jugis, lanceolato-ellipticæ, longiacuminatæ, circa 20 cm. longæ, 3–4 cm. latæ, laterales venæ longitudinales prominentes, interdum spinis paucissimus ad vel prope costam; hami terminales graciles, divaricati vel reflexi, 2–3 cm. longi: spatha longa angustaque, longiacuminata, 3–4 dm. longa, 2 cm. lata, dense breviaculeata: fructus brevioblongi, breviter acuminati, leves, circa 15 mm. longi et 10–11 mm. crassi, inermes; semen magnum, valde reticulatum.

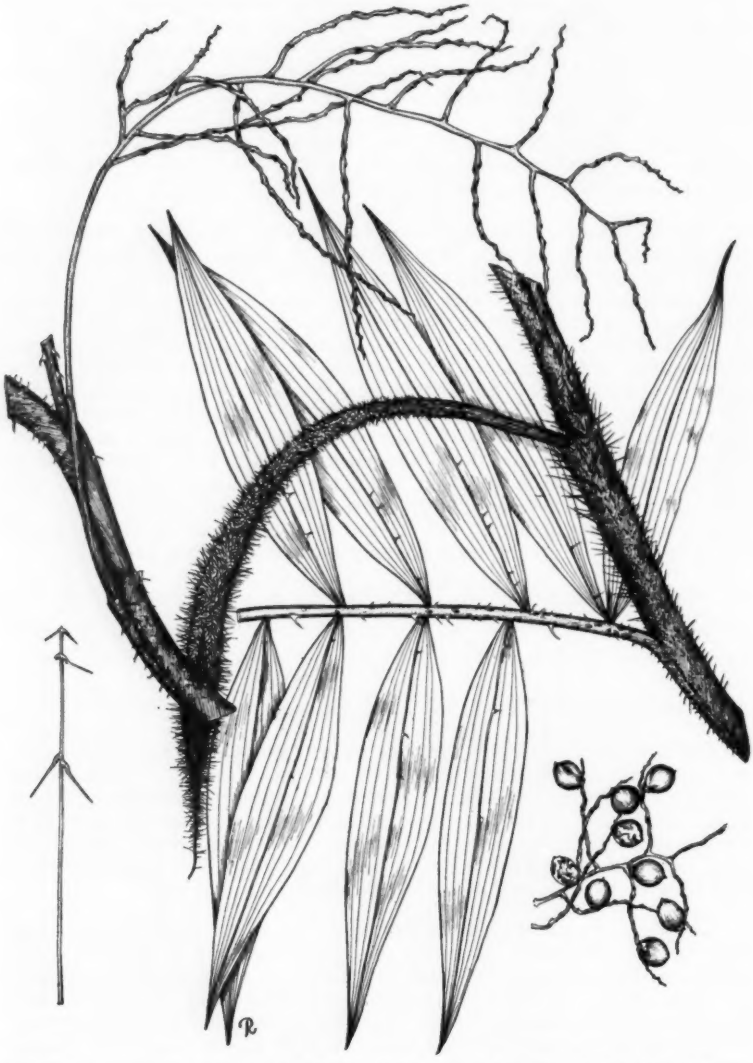
Strong glabrous climber, not heavily armed, with many small weak divaricate spines 5–15 mm. long on stems or canes: leaves long-pinnate, petiole and midrib bearing scattered hooked prickles 4–10 mm. long; pinnæ alternate or scattered or sometimes opposite, 10 or a dozen pairs or doubles, lance-elliptic and taper-pointed, 20 cm. more or less long, about 3–4 cm. broad at middle or on some leaves only 1.5 cm. broad, lateral longitudinal veins prominent but secondary costæ absent, now and then a spinelet on midnerve or elsewhere but mostly nude; terminal hooks slender, divaricate or reflexed, 2–3 cm. long, the blade not expanded or flattened: spathe long and narrow and slender-pointed, 3–4 dm. long, 2 cm. broad, densely covered with short hair-like spines 5–10 mm. long, peduncle nearly unarmed; spadix simple, unarmed, rachillæ 8–12 cm. long, scarcely undulate although not rigidly straight: fruit short-oblong, briefly pointed, about 15 mm. long at dry maturity and 10–11 mm. broad, brown, glabrous and unarmed, shell very thin; seed strongly reticulated, filling the shell.

Venezuela, state of Miranda: Cárdenas in Siquire Valley, 400–800 m., *Pittier 7078* (type); Hacienda de Marare, near Ocumare del Tuy, 300–1200 m., *Pittier 7795.*

† **Desmoncus apureanus,** spec. nov. Fig. 77.

Scandens ad 2 m., sparse armatus, glaber: folia virella supra subterque, rachis nuda vel paucis acuminibus vel aculeis debilibus 1–2 cm. longis; pinnæ 12–20, pæne oppositæ vel sparsæ, latilanceolatæ, longiacuminatæ, 15–20 cm. longæ, 2–3.5 cm. latæ, multinervatæ; unci terminales validi, acuti, valde reflexi, 3–6 cm. longi: spadicis rachillæ 10 vel plus cm. longæ, simplices, undulatæ: fructus oblongi, 15 mm. longi, 7–8 mm. lati, apex brevissimus, inermis, cupula calycis minima.

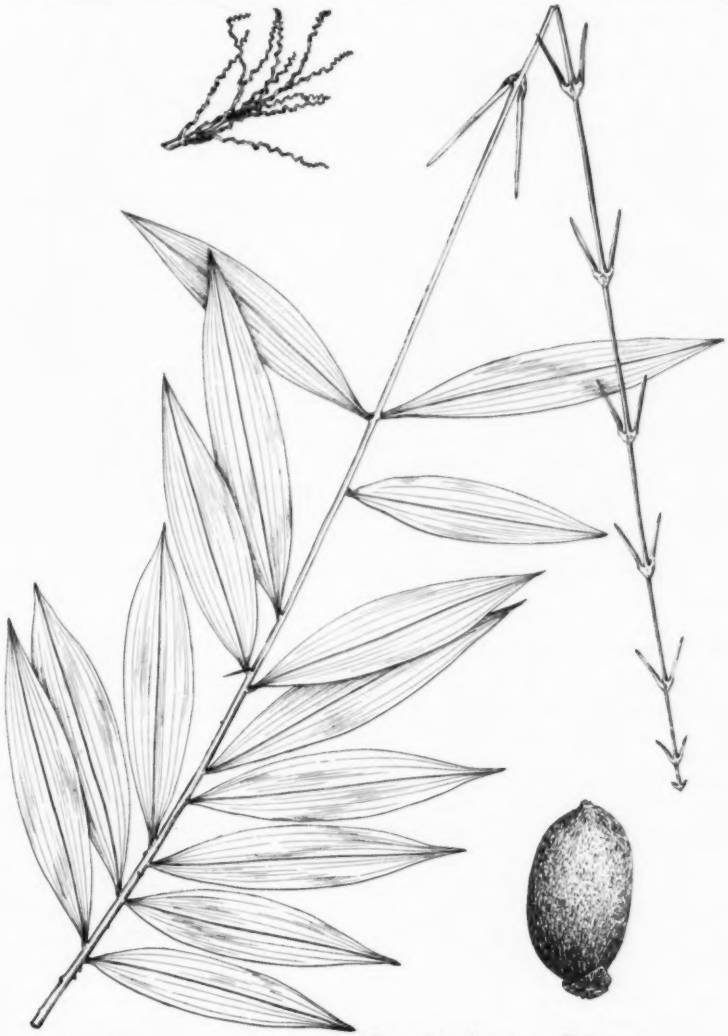
Climbing to 2 m., scantily armed, glabrous: leaves light green on both surfaces, under surface minutely pimpellate under 20 diameter lens, rachis bearing scattered thick nodule-prickles 1–2 mm. long and perhaps a few black spines 1–2 cm. long; pinnæ 12–20, nearly opposite to scattered, broad-lanceolate, long-tapering to apex, 15–20 cm. long, 2–3.5 cm. broad, strongly many-nerved; terminal hooks on stiff angled axis, stout, sharp-edged, strongly reflexed, 3–6 cm. long: spathe not seen; branches of spadix 10 or more cm. long, simple, rachillæ 4–6 cm. long, strongly undulate or



76. DESMONCUS MIRANDANUS ×⅓. Fruit ×⅓ at lower right. Terminal hooks at lower left.

wavy, the rachis perhaps bearing few very short weak prickles: fruit oblong, 15 mm. long, 7 or 8 mm. thick, nearly obtuse at brief apex, unarmed, calyx-cup very small, shell hard and thick; seed not developed.

Southern Venezuela, abundant in thickets on road to Churruscao,



77. DESMONCUS APUREANUS ×⅓. Part of spadix at top. Fruit ×2.

west of San Fernando de Apure, *C. E. Chardon*. San Fernando de Apure is on the Orinoco, western part of Estado de Bolivar, near the juncture of Rio de Apure.

† **Desmoncus Velezii,** spec. nov. Fig. 78.

Gracilis, scandens, glaber præter in spatha: folia circa 8 dm. longa; pinnæ 5–7 in utroque rachis latere, 16–20 cm. longæ, 4 cm. vel minus latæ, longo-lanceolatæ et longo-acutæ, valde multinervatæ, spinæ irregulares in rachi, 2–5 cm. longæ; unci terminales 5–7 paribus, crassi basi et recurvi, unci inferiores plani et 1 cm. lati, 8 cm. longi basi cirrhi ad 1 cm. longi apice: spatha circa 20 cm. longa, 3–4 cm. lata expansione, gracilibus aculeis sparsis 1 cm. vel minus longis; spadix tam latus quam longus, rami 8 cm. vel minus longi: fructus oblongi, 10–13 mm. longi, 1 cm. lati, inermes.

Slender but vigorous, tall-climbing: leaves thin, glabrous, green both surfaces, with opposite or scattered spines 3–5 cm. long on petiole and midcosta; pinnæ 10–12 or more, scattered or the upper ones opposite, lanceolate to elliptic-lanceolate, 12–20 cm. long, 2–3 cm. broad, acuminate, unarmed unless a spicule or two near apex, lateral longitudinal veins many but not very conspicuous; terminal unci or hooks broad, reflexed, not very sharp, thickened at base, 1–4 cm. long, lowest ones expanded: spathe narrow, 12–14 cm. long, 1.5–3 cm. broad, tapered to prominent point, covered loosely with short divaricate weak hair-like aciculæ, peduncle very short; spadix small, simple, about 9 cm. long, peduncle slightly aculeate; rachillæ very slender, prominently undulate; calyx cupulate, entire, about 2 mm. broad, exceeded somewhat by the pistil: fruit ellipsoid or obovoid, abruptly pointed, 1.5 cm. long, 1 cm. broad, unarmed.

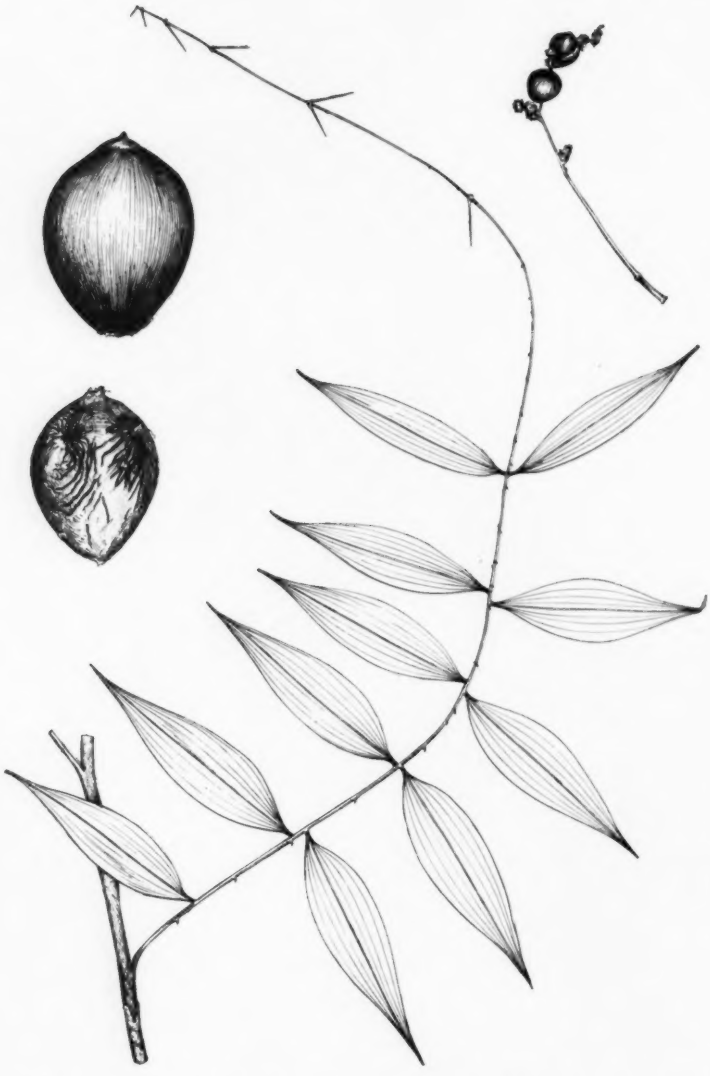
Southwestern Venezuela, at Puerto Paez in Apure, *I. Velez* (of Puerto Rico) *2308*.

† **Desmoncus vacivus,** spec. nov. Fig. 79.

Debillimus et ut videtur parvus, glaber, scandens, sparse armatus; caulis tenuis, 1 cm. vel minus crassus vaginis reticulatis apice: folia tenuia, viridia utrinque; pinnæ circa 5 paribus oppositis, lanceolato-ellipticæ, longiacuminatæ, 10–12 cm. longæ, 2–3.5 cm. latæ, costatæ; petiolus et costa media aculeis hamatis 1–2 mm. longis; hami terminales valde graciles, reflexi, circa 4 paribus, 2 cm. vel minus longi: fructus ellipsoidei, 2–2.5 cm. longi cum sicci, 2 cm. lati, apex brevissimus, glaber, inermis, scissus longitudine; semen valde reticulatum.

Very weak (powerless, *vacivus*) glabrous climber only minutely armed; stem thin, apparently not spiniferous, 1 cm. or less thick with short sheaths reticulate at apex: leaves thin, green both surfaces, with about 5 pairs of opposite lance-elliptic acuminate leaflets 10–12 cm. long and 2–3.5 cm. broad, lateral ribs prominent and intervening longitudinal veins not conspicuous; petiole and midrib bearing hooked prickles 1–2 mm. long; terminal hooks about 4 pairs at end of long cirrhus, reflexed, very slender, 2 cm. or less long: spathe not seen; spadix perhaps simple: fruit ellipsoid,

78. DESMONCUS VELEZII × about ⅓. Sheath and petiole-base at lower left. Spathe and spadix, with fruit, at upper right.



79. DESMONCUS VACIVUS ×⅓. Cirrhus short and very slender. Fruit and nut ×1½, the latter showing radiated micropyles.

large for the genus, 2–2.5 cm. long when dry and 2 cm. broad, glabrous, unarmed, apical point very short, shell at length splitting lengthwise, basilar cup remaining on the rachis; seed much reticulated.

Southern Colombia, Rio Igaraparaná, los alredadores de La Chorrera, Amazonas, altitude about 180 m., *R. E. Schultes 3941*.

9. COMMENTS ON REINHARDTIA AND MALORTIEA

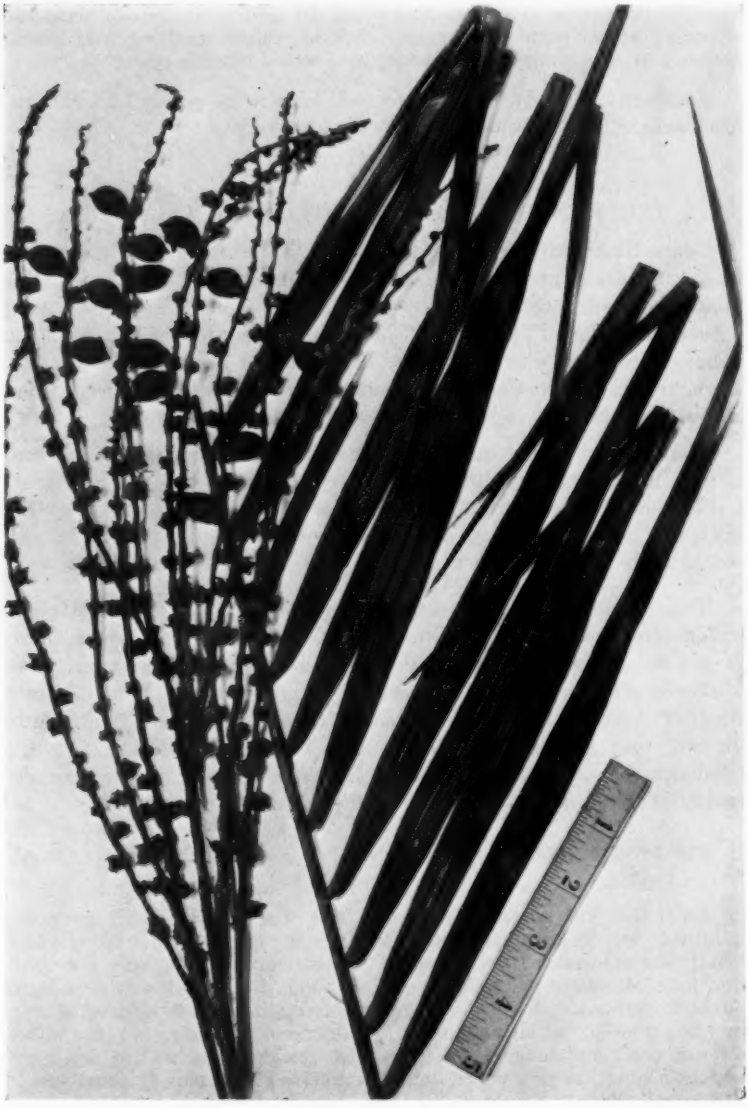
Genus Reinhardtia was founded in 1845 by Liebmann on a plant from southern Mexico; person for whom it was named is not disclosed. Genus Malortiea was founded in 1853 by Wendland on a plant from Guatemala; it bears the name of Dr. Ernst V. Malortie, of the military service of the Kings of Hanover, where Wendland lived. Species in each genus are few. They are small or even very small palms with pinnate or pinnately-veined leaves, allied perhaps to the Geonoma and Chamædorea groups.

The two genera were united by Drude, 1889, kept distinct by Dammer in 1901, united again by Burret in 1932, separated again by Bailey in 1943. I still hold to the separation, but shall not now repeat the reasons stated in Gentes Herbarum, vi, 258–260. New and better material and notes may considerably modify judgments in these groups.

True Reinhardtias are two, *R. elegans*, Liebm., in southern Mexico, and *R. gracilior*, Burret, in British Honduras, and I now add a third; *R. elegans* has never been fully described. True Malortieas are five: *Malortiea gracilis*, Wendl., Guatemala, *M. Koschnyana*, Wendl., Costa Rica, *M. latisecta*, Wendl., Guatemala, *M. rostrata*, Bailey (Gent. Herb. vi, 260, 1943), Costa Rica, *M. simplex*, Wendl., Costa Rica. This list eliminates *M. intermedia*, *M. lacerata*, *M. speciosa*, which are *nomina nuda*, and *M. Tuerckheimii* which is *Kinetostigma Tuerckheimii*, Burret.

Reinhardtia elegans, Liebm. ex Mart. Hist. Nat. Palm. iii, 311 (1849). Fig. 80.

Erect tree with single bole 2.5–6 m. tall, with interfoliar inflorescence, unarmed: leaves terminal, horizontal, 1–2 m. long, in an umbrella-like head; pinnæ linear to linear-lanceolate, in many pairs closely set, 8–12 dm. long, slenderly pointed, 1–1.5 cm. broad, dull in color to semi-lucid on both surfaces, midrib very prominent, main parallel side veins 2–4, margins smooth, petiole channelled: spadix erect, forked above into about a dozen erect nude angled nearly parallel straight branches 3–4 dm. long, peduncle long; flowers white, lightly immersed in a cup of short bracts and sepals, petals longer, acute and persisting, sterile flowers bearing several or many stamens with very short filaments and no pistillodes, fertile flowers with no staminodes and a trigonous uniloculed ovary:



80. REINHARDTIA ELEGANS, somewhat less than ½ natural size. Part of a leaf, and spadix with mature fruit.

fruit dark purple, divaricate or lightly ascending, 1.5 cm. plus long, abruptly narrowed to a short beak, 10–12 mm. thick when dry, retaining the calyx-cup; seed filling the pericarp, albumen much ruminated.

Mexico, state of Oaxaca, about 1200 m. altitude.

Reinhardtia gracilior, Burret, in Notizbl. Bot. Gart. Berlin, xi, 555 (1932).

Cespitose, about 1 m. tall; caudex arundinaceous, 6 mm. thick, rings 3 cm. asunder: leaves small, thin, somewhat lighter colored underneath, about 20 cm. long, deeply furcate with 2 segments on either side of which the terminal pair is much the larger, primary nerves 10, lower segments about 11 cm. long and 18 mm. broad, strongly dentate, primary nerves 3: spadix in axil of leaves, about 1.5 dm. long, the branching or floral part about 1 dm. long, rachillæ 4, simple, bearing flowers spirally, staminate and pistillate together, upper ones staminate: fruit 15 mm. long, black, elliptic-oblong, not rostrate but remains of stigma apparent, albumen not ruminate.

British Honduras, Stann Creek Valley at 100 m. altitude.

† **Reinhardtia spinigera,** spec. nov. Fig. 81.

Palma erecta humilisque a *R. elegante* differens folii costa media sparsis deflexis spinis albida basi 3–5 cm. longis, foliolis latilanceolatis, tenuibus, 3–4 cm. latis ad vel super medium, 2–3.5 dm. longis, valde multinervatis, ad basin angustatis, apice angustissimo vel etiam filifero, spadicis rachillis paucis et solis 1.5–1.8 dm. longis, petalis minus conspicuis, fructibus parvo majoribus crassioribusque et abruptius acuminatis.

Erect, 2 to about 3 m. tall, apparently with habit of *R. elegans* from which it differs in bearing white-based deflexed scattered spines 3–5 cm. long on the midrib of the leaf, and in the following characters: leaves thin in texture, bright green to luminous; leaflets broad-lanceolate, 3–4 cm. broad at or above the middle, 2–3.5 dm. long, strongly many-nerved, narrowed to base, apex long-tapering and very narrow or the point filiferous, rachillæ of spadix few and short and only 1.5–1.8 dm. long, petals much less conspicuous on the rachis, fruits a little larger and thicker and more abruptly pointed.

Mexico, northeastern Oaxaca, near Latani, District of Choapam, in dense forest at 1600 m. altitude, *R. E. Schultes 866.*

10. OTHER PALM STUDIES

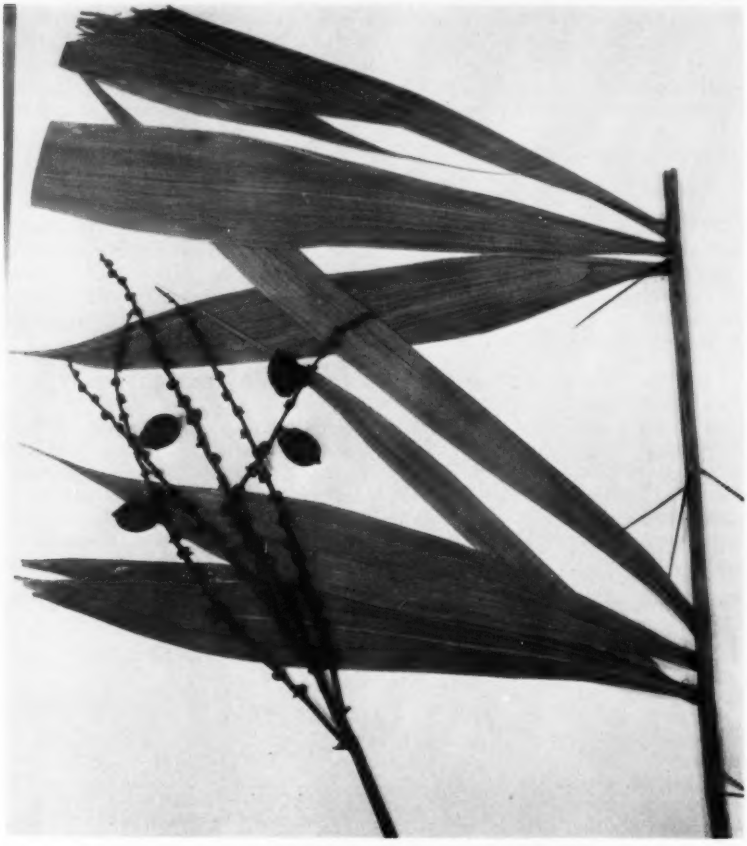
by H. E. Moore, Jr.

† **Attalea Allenii,** H. E. Moore, spec. nov. Fig. 82.

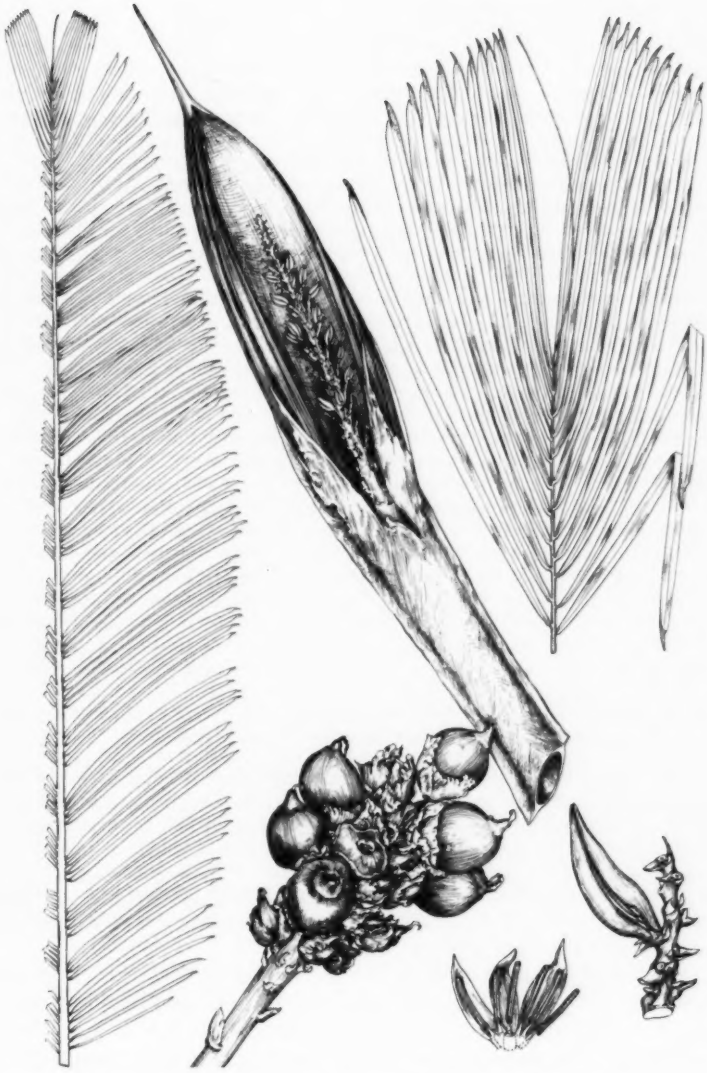
Planta acaulis: folia interrupte pinnata, ca. 5 m. longa; pinnæ lineares apice bidentatæ, glabræ, griseo-virides, utrinsecus 85–87, terminales 9–10 plus minusve regulariter dispositæ apicibus coherentes, reliquæ liberæ in

gregibus alternis vel plerumque suboppositis dispositæ, 28–70 cm. longæ, 3–40 mm. latæ, nervis primariis singulis: spadix staminatus simpliciter ca. 50-ramosus, pedunculo 8 cm. longo, cymbis duabus, cymba exteriore 30 cm. longa, 4 cm. lata, dense ferrugineo-lepidota, cymba interiore 35 cm. longa, rostrata rostro 7 cm. longo, rachi 16 cm. longa, rachillis 1–1.5 cm. longis; flores 6–8 ad rachillam biseriati, calyce minuto, petalis lanceolato-apiculatis, 11–13 mm. longis, 2–3 mm. latis, staminibus 6: spadix pistillatus simplex, pedunculo 34 cm. longo, rachi 10 cm. longa fructibus ca. 25: fructus (immaturus) sessilis, ovoideus, rostratus, 5 cm. longus, 3 cm. latus, dense ferrugineo-lepidotus.

Acaulescent: leaves 12–15, about 5 m. long; petiole 80 cm. long, convex,



81. Reinhardtia spinigera. Small palm of southern Mexico, singular in its genus by bearing spines. Nearly one-half full size.



82. ATTALEA ALLENII. Diagrammatic leaf $\times 1/21$; terminus of leaf $\times 1/6$; staminate and pistillate spadices $\times 1/5$; staminate rachillæ $\times 2$; staminate flower $\times 1\frac{1}{2}$.

dull, fulvous and densely ferrugineous-lepidote dorsally, concave, lustrous, fulvous and glabrous ventrally, 2.5 cm. diameter at base, 2 cm. diameter at apex; sheath not seen; rachis 3.3 m. long, terminating in a slender round flexuous awn about 35 cm. long, dorsally convex, dull and densely ferrugineous-lepidote, ventrally bicanaliculate and medially ridged, the ridge lustrous, fulvous, glabrous, disappearing apically, the canaliculæ dull gray-green; pinnæ interruptedly pinnate, linear, glabrous, gray-green above, paler below, the margins narrowly ferrugineous-lepidote, the upper broadly so on the under surface toward the bidentate unilaterally caudate apex, 85–87 on each side of the rachis, the apical 9–10 more or less regularly spaced, separated basally, coherent at the apex forming two broad lobes about 10 cm. wide at the terminus of the rachis, the lower and median in alternate to mostly opposite or subopposite groups of 2–5 at intervals of 5–10 cm., 28–70 cm. long, 3–40 mm. wide, with 1 primary nerve, 4–5 secondary nerves and innumerable transverse nervelets: spathes produced at ground level, the fruiting clusters often so low in the leaf-axil as to be half buried in the ground (fide Allen); staminate spadix about 50-branched; peduncle 8 cm. long; cymbæ 2, the outer 30 cm. long, 4 cm. wide, two-edged fulvous and densely ferrugineous-lepidote outside, lustrous, glabrous and ferrugineous within, the apex short and rounded, the inner canaliculate-striate, blackish, 35 cm. long with a flattish apical rostrum 7 cm. long; rachis 16 cm. long, included in the cymba, rachillæ 1–1.5 cm. long, bearing 6–8 flowers in two ranks subtended by ovate to lanceolate bracts 1.5–2 mm. long; flowers pale in drying, calyx minute, the sepals deltoid, 1 mm. long, petals valvate, lanceolate-apiculate, flat, 11–13 mm. long, 2–3 mm. wide, very shortly connate at the base, stamens 6, the filaments 1 mm. long, the anthers straight, 6 mm. long: pistillate spadix unbranched; peduncle about 34 cm. long, 1 cm. diameter; cymbæ not seen; rachis 10 cm. long; old flowers and young fruit about 25, crowded and sessile on the rachis, subtended by broad-based acute bracts 4–15 mm. long: immature fruit ovoid, 2-celled, 5 cm. long, 3 cm. diameter, rostrate, with a rostrum 1 cm. long, subtended by elongate erose cupular perianth; exocarp fibrous, densely ferrugineous-lepidote, appearing smooth, 1.5 mm. thick; mesocarp thin, fibrous; endocarp osseous, 1 mm. thick; seeds unknown.

Panama, Province of Colón, very common in heavy virgin forest, averaging in some places 10–15 to the acre, Rio Viejo, vicinity of Puerto Pilon, altitude 10 m., February 2, 1947, *Paul H. Allen 4103* (Herb. Mo. Bot. Gard.).

Named for the collector whose critical notes and ample specimens have contributed much to the study of American palms and who correctly indicated this species as new to Panama.

The extremely short rachillæ of the staminate spadix, the staminate flowers with 6 stamens and the apparently unbranched pistillate spadix set *Attalea Allenii* apart from *A. acaulis*, Burret, and *A. exigua*, Drude, the two other acaulescent species of subgenus Euattalea having the pinnæ grouped along the rachis.

Pittier 4237 in the United States National Herbarium is probably re-

ferable here. The collection consists only of a complete leaf in thirteen sections taken in forests at Loma de la Gloria, near Fató (Nombre de Dios), altitude 10–104 m., Province of Colón, Panama, July and August 1911.

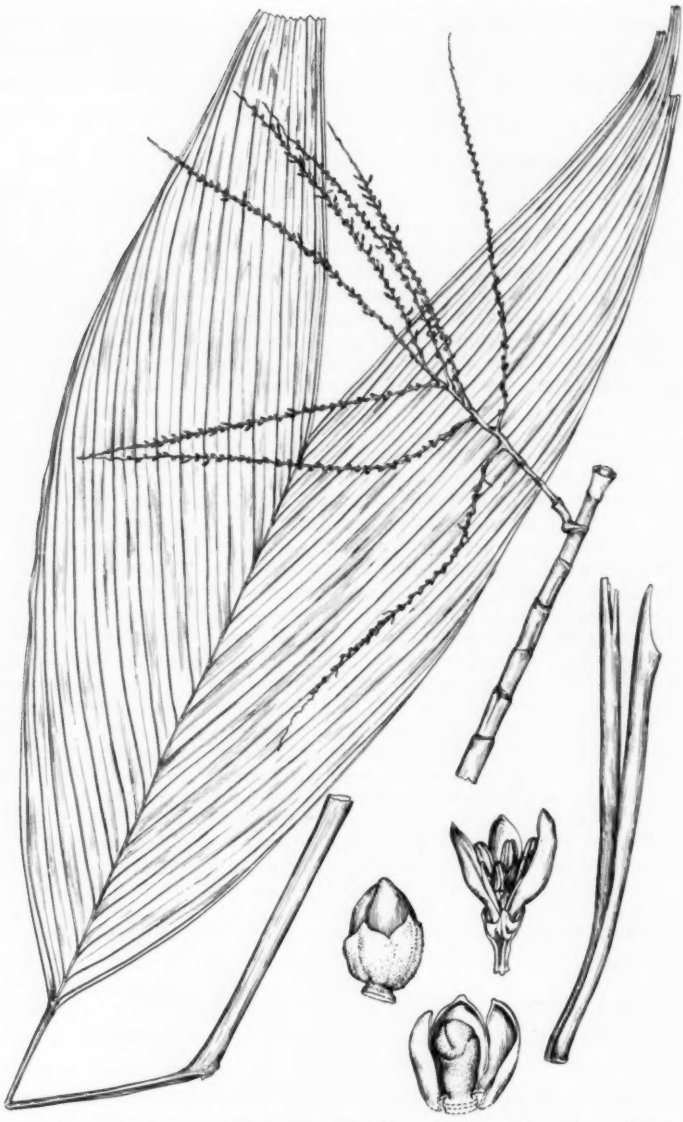
† **Hyospathe concinna,** H. E. Moore, spec. nov. Fig. 83.

Arbor gracilis ad 3 m. alta, caules 1 cm. crassi, nodis obliquis: folia simplicia, in ambitu obovata, bifurcata, ca. 50 cm. longa, 21.5 cm. lata rachis apice, supra glabra, subtus nervis lepidota, rachi 30 cm. longa, nervis primariis utrinsecus 17–18: spadix simpliciter 8-ramosus, pedunculo 4.7 cm. longo, rachi 5.5 cm. longa, rachillis 15–18 cm. longis; flores rosei, flores staminati elongati, pedicellati, calyce minuto trilobato, petalis linearis 3–4 mm. longis, staminibus 6 conspicue biseriatis, flores pistillati sessiles ovoidei, calyce trilobato, petalis ovatis 2–2.6 mm. altis, pistillo obconico 2 mm. longo, stigmatibus minutis sessilibus, subterminalibus: fructus ignotus.

Caulescent, slender, about 3 m. high (fide Allen), the trunk 1 cm. thick, glabrous, the nodes oblique, the internodes 2–2.5 cm. long: leaves simple, bifurcate; sheath very sparsely lepidote, closely striate, 15 cm. long; petiole 12 cm. long, convex below, flattish above, sparsely lepidote, striate; rachis 30 cm. long, not extended in a free tip; blade obovate in outline, bifurcate more than one-third its length, 21.5 cm. wide at apex of rachis, 50 cm. long on outer margin, 21 cm. long on inner margin, the free lobes lanceolate, somewhat falcate, glabrous above, sparsely brown-lepidote on the nerves below; primary nerves 17–18 on each side, secondary and tertiary nerves thin and inconspicuous: spadix 8-branched; spathe rings 3, the one spathe seen closely striate, glabrous, 23 cm. long, 1 cm. wide; peduncle 4.7 cm. long, expanded at the base and encircling the trunk; rachis 5.5 cm. long; rachillæ simple, 15–18 cm. long, 1 mm. thick, divaricate to ascending and somewhat flexuous, granular-puberulent: flowers pink (fide Allen), in groups of 3 along the rachis, a single pistillate between 2 staminate; staminate flowers in bud elongate on pedicels 1.4–2 mm. long, calyx minute, granular, 0.8 mm. high, 3-lobed, the lobes acute, petals valvate, nearly linear, 3–4 mm. long, glabrous, stamens 6, 2-ranked, those opposite the petals longer and partially adnate to the cylindric pistillodium; pistillate flowers in bud ovoid, sessile, calyx cupular, 3-lobed, sparsely granular-puberulent, about 1.6 mm. high, petals ovate, imbricate, 2–2.6 mm. long, pistil 2 mm. long, the stigmas minute, sessile, terminal or subapical: fruit not known.

Panama, Province of Coclé, vicinity of El Valle de Anton, altitude about 600 m., December 8, 1938, *Paul H. Allen 1202* (Herb. Mo. Bot. Gard.).

Hyospathe concinna is closely related to *H. Schultzeæ*, Burret, of Ecuador and *H. simplex*, Burret, of Colombia. From the former it is distinct in the larger leaf, larger spadix with long rachillæ and the longer pedicillate



83. HYOSPATHE CONCINNA. Leaf, stem with spadix, spathe ×⅓; staminate flower ×5; pistillate flowers ×8.

staminate flowers. From the latter it differs in the longer petiolate larger and less deeply furcate leaf, the few long rachillæ of the spadix and the larger staminate flowers.

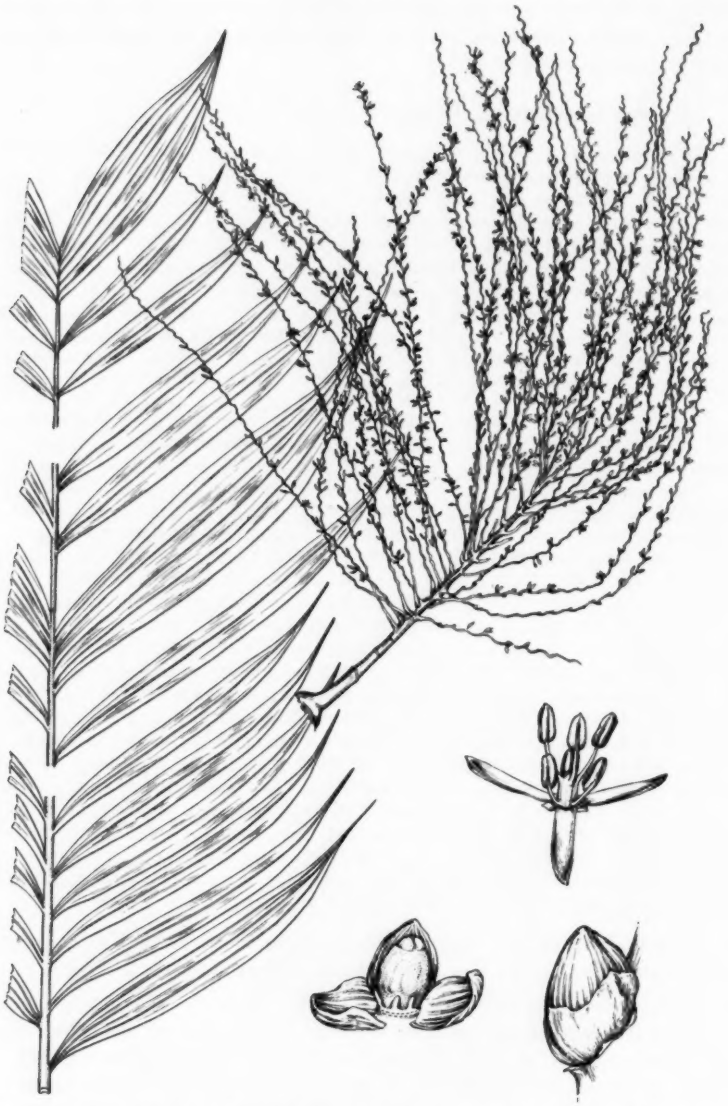
† **Hyospathe pallida,** H. E. Moore, spec. nov. Fig. 84.

Arbor gracilis: folia 1.5 m. longa, pinnata; pinnæ supra griseo-virides et glabræ, subtus pallidiores et nervis lepidotæ, lanceolato-falcatæ, 25–40 cm. longæ, infimæ 4 cm. latæ nervis primariis 3, mediæ 2.5–3 cm. latæ nervis primariis singulis cum jugo centrali 8–9 cm. lato, 4–5-nervato interjecto, supremæ 5-nervatæ, 5 cm. latæ: spadix simpliciter 25–40-ramosus, pedunculo 5–5.5 cm. longo, rachi 7.5–11.5 cm. longa, rachillis ad 23 cm. longis: flores flavidi; flores staminati elongati, pedicellati, calyce minuto trilobato, petalis linearis 4 mm. longis, staminibus 6 conspicue biseriatis; flores pistillati sessiles, ovoidei, calyce cupulato trilobato, petalis ovatis 2 mm. longis, staminodiis 5–6, ligulatis, pistillo ovoideo, stigmatibus sessilibus terminalibus: fructus ignotus.

Caulescent, slender: leaves 1.5 m. long (fide Schultes), pinnate; sheath and petiole gray-green, sparsely brown-lepidote, striate; blade incomplete, received in three fragments, those portions of the rachis seen totalling 72 cm. in length with 11–13 pinnæ on each side; pinnæ opposite or subopposite, gray-green and glabrous above, slightly paler with brown-lepidote nerves below, lanceolate, falcately tapered to an acuminate apex, 25–40 cm. long, the lowest 4 cm. wide with 3 primary nerves, the intermediate 2.5–3 cm. wide and 1-nerved with an interjected central pair 8–9 cm. wide having 4–5 primary nerves, the terminal 5 cm. wide and 5-nerved: spadix 25–40-branched; peduncle 5–5.5 cm. long, two-ringed; spathes not seen; rachis 7.5–11.5 cm. long; rachillæ simple, gray-granular-puberulent, ascending, very slender and somewhat flexuous, the lower 21–23 cm. long, the upper little shorter, about 1 mm. wide and only slightly enlarged at the base: flowers yellow (fide Schultes), in groups of 3 along the rachillæ with a single pistillate between 2 staminate below, staminate above, staminate flowers elongate, on pedicels 0.5–1 mm. long, calyx minute, 3-lobed the lobes acute, petals valvate, glabrous, linear, about 4 mm. long, stamens 6, two-ranked, those opposite the petals longer and inserted near the apex of the cylindric pistillodium; pistillate flowers ovoid, sessile, calyx cupular, 1.2 mm. high, minutely-granular, 3-lobed, petals imbricate below, valvate at apex, ovate, 1.6–2 mm. long, staminodia 5–6, ligulate, pistil ovoid, stigmas sessile, terminal: fruit not known.

Colombia, Putumayo, Uchupayaco, en la planada entre Urcusique y Umbria en las orillas del Río Uchupayaco, altitude 300 m., February 22–23, 1942, *R. E. Schultes 3291.*

There is a marked resemblance between the spadices of this collection and those portrayed in the photograph of the type of *Hyospathe filiformis*, Wendl. ex Drude (Field Museum negative 18527) except that the apical rachillæ are nearly as long as the basal. The terminal rachillæ of the Martius collection cited by Wendland are as little as half as long as the



84. HYOSPATHE PALLIDA. Portions of leaf ×1/6; spadix ×1/3; staminate flower ×4; pistillate flower expanded ×8.

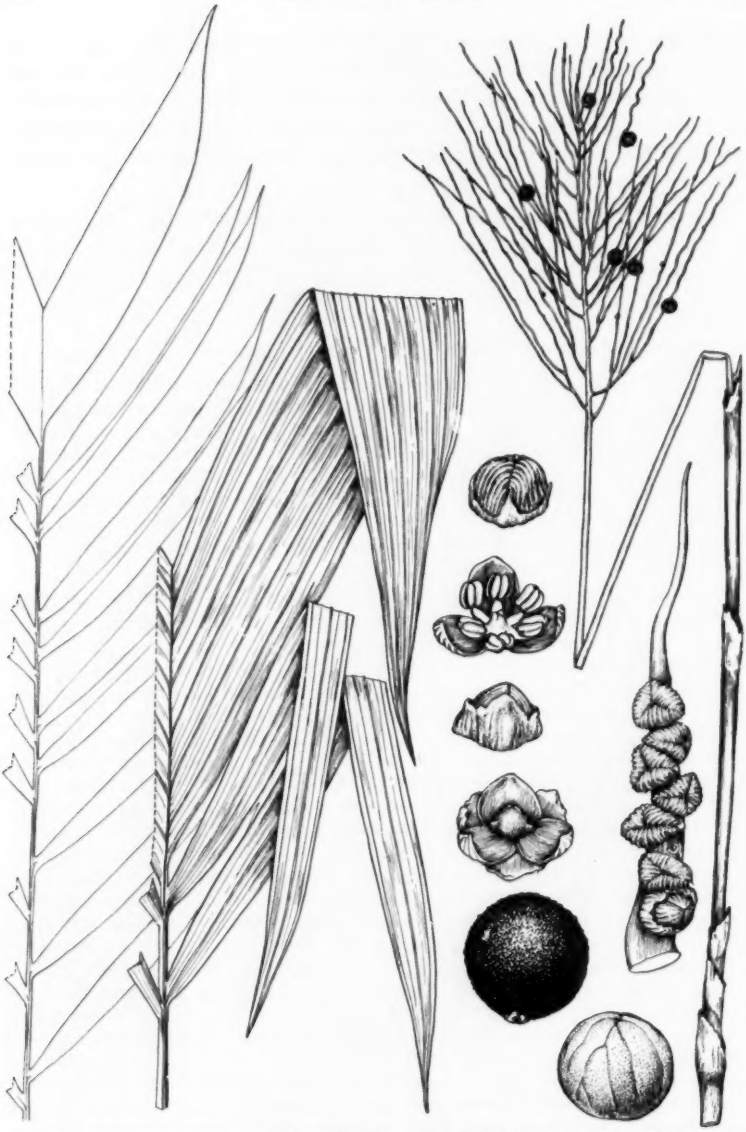
basal. Flower-buds compare closely in size and shape. The leaf of the present material, however, is wholly different, being much more like that of *H. Lehmannii*, Burret, while that described by Wendland is essentially the leaf of *H. elegans*, Mart. New collections from the type area are needed to clarify the species and ascertain whether Wendland had leaf and spadix from the same plant.

Hyospathe pallida is closely allied to *H. gracilis*, Wendl., from which it differs in the larger spadix and interposed 2–3-nerved pinnæ, and to *H. Lehmannii* from which it differs in the short peduncle and numerous spadix branches with yellow not deep red buds.

† **Synechanthus mexicanus,** Bailey in herb., spec. nov. Fig. 85.

Planta acaulis: folia interrupte pinnata, ca. 2 m. longa; pinnæ utrinsecus 10, inferne alternæ, superne in jugis subopositis dispositæ, linearilanceolatæ, 38–44.5 cm. longæ, 2–3 cm. latæ, nervis primariis singulis præter unum jugum terminale latius 6-nervatum: spadix longipedunculatus, 20–25-ramosus; spathis 5, tubulosis, rachillis (5)–14–26 cm. longis, rachillis infimis 1–2-furcatis, rachillis supremis simplicibus: flores ca. 1 mm. alti, staminati depressi et angulosi, pistillati ovoidei: fructus globosus vel depresse globosus, 12 mm. crassus, aurantiacus, in siccatione nigrescens, albumine plano.

Acaulescent: leaves interruptedly pinnate, about 2 m. long (fide Hernandez & Sharp); petiole and sheath glabrous, finely striate; rachis 78 cm. long, glabrous, greenish-brown; pinnæ glabrous, gray-green and dull above, darker with yellowish nerves below, 10 on each side, the lower alternate at intervals of 9–10 cm., the upper in subopposite pairs at intervals of 5.5–7 cm., linear-lanceolate, falcately tapered on the lower margin to a slender apex, 38–44.5 cm. long, 2–3 cm. wide at the middle with 1 primary nerve and 2 secondary nerves on each side, the terminal pair 6-nerved, 13.5–14.5 cm. along the rachis, about 6.5 cm. wide at apex of rachis, 43–45 cm. long on midvein, 35–38 cm. long on the straight upper margin, falcately tapered on the lower margin to a short-acuminate tip: spadix 20–25-branched; peduncle to 120 cm. long, 1 cm. wide and somewhat flattened at the base, 5 mm. wide and nearly terete at apex; spathes 5, tubular, the outer short, the inner 25–60 cm. long and closely investing the peduncle; rachis 14.5–25.5 cm. long; rachillæ ascending, slender, flexuous, spinose-tipped, minutely granular, (5)–14–26 cm. long, the lower 1–2-furcate, the upper simple: flowers 5–9 in distichous acervuli, conspicuously dark-nerved, the lowermost pistillate, the remainder staminate; pistillate flowers ovoid in bud, calyx 0.4–0.6 mm. high, cupular, 3-lobed, the lobes more or less erose, petals imbricate below, valvate at the apex, broadly ovate, 0.8–1 mm. high and about as wide, staminodia absent, pistil ovoid in general outline, about 0.6 mm. high, 3-angled at the base with small protuberances, stigmas sessile, terminal; staminate flowers depressed and angled in bud, sepals lanceolate, 0.6–0.8 mm. high, connate basally in a low ring, petals valvate, broadly ovate, 1–1.2 mm. long and about as wide, stamens 6, about two-thirds as long as the petals, pistillodium minute, 3-lobed:



85. SYNECHANTHUS MEXICANUS. Leaf diagram and spadix ×1/6; terminus of leaf ×1/3; fruit and seed ×1½; acervulus ×7; floral details (staminate above, pistillate below) ×10.

fruit globose or depressed-globose, about 12 mm. diameter, orange at maturity (fide Hernandez & Sharp), blackish and pebbled when dry, stigmatic scar lateral; endocarp thin, gray-brown, openly channelled; endosperm homogeneous.

Mexico, Oaxaca, deep shade, frequent from 1000–1250 m., Finca "La Gloria" (on Rio Negro watershed) back over the sierra to Rio Grande (north of Niltepec), April 3, 1946, *E. Hernandez Xolocotzi & A. J. Sharp X-1287.*

First representative of the genus known from Mexico, *Synechanthus mexicanus* is similar to *S. fibrosus*, Wendl., of Costa Rica and Guatemala but differs in acaulescent habit, globose not elliptic fruit and in having the upper pinnæ in several groups of two rather than in two groups of several or in uninterrupted arrangement along the rachis.

The relationship to *S. fibrosus* is obviously close and the two species are readily separated from others by the furcate lower rachillæ. Wendland described the genus as having ruminate endosperm, and listed *S. fibrosus* and *S. Warscewiczianus* as the original species. Hooker (Bot. Mag. t. 6572, 1881), however, illustrated and described *S. fibrosus* from a living plant at Kew sent from Hanover by Wendland. Here the fruit is said to have equable albumen. Mature fruit for further study has not been available but if such is the case these species would appear to form a natural subgenus further distinguished by homogeneous endosperm.

† **Synechanthus panamensis,** H. E. Moore, spec. nov. Fig. 86.

Arbor gracilis ad 6 m. alta: folia regulariter pinnata; pinnæ glabræ, lineares vel linearilanceolatæ apicibus breviter caudatis et nonnihil falcatæ, 21–35 cm. longæ, 0.8–4.2 cm. latæ, nervis primariis singulis vel interdum binis: spadix simpliciter ca. 50-ramosus, pedunculo 50 cm. longo, spathis 6, exterioribus ovatis, interioribus tubulosis, rachi 18 cm. longa, rachillis simplicibus, 19–33 cm. longis: flores pistillati 1.6–1.8 mm. alti, ovoidei: fructus obpyriformis, 10–13 mm. longus, apice 10 mm. latus, luteus, in siccatione nigrescens, albumine ruminato.

Caulescent, to 6 m. high (fide Allen): leaves regularly pinnate, the entire blade not seen, received in two fragments; rachis glabrous, green, those portions seen totalling 57.5 cm. long with 17–20 pinnæ on each side; pinnæ glabrous, dull semi-iridescent green when dry, linear to linear-lanceolate, short-caudate and slightly falcate to somewhat sigmoid, those seen 21–35 cm. long, 0.8–2.5 or rarely 4.2 cm. wide with 1 or rarely 2 primary nerves and 2 secondary nerves on each side: spadix about 50-branched; peduncle 50 cm. long, 1.5 cm. diameter at base, 7 mm. diameter at apex; spathes 6, thin, papery, fibrous and shredded in age, the outer short, ovate, the inner tubular, somewhat shorter than and investing the peduncle; rachis glabrous, 18 cm. long; rachillæ simple, glabrous, ascending, spinose-tipped, 19–33 cm. long, 2–3 mm. wide at base, becoming flattened, slender and flexuous above: flowers 7–9 in distichous acervuli, the lower-

86. SYNEOHANTHUS PANAMENSIS. Portion of leaf, spadix ×⅓; acervulus ×4; pistillate flower ×5; fruit and seed details ×2.

most pistillate, the remainder lacking but indicated by scars; pistillate flowers ovoid, the sepals broadly ovate to nearly hemispheric, 0.8–1 mm. long, 1.6 mm. wide, shortly connate to nearly free, petals imbricate below, broadly ovate, 1.6–1.8 mm. long, staminodial ring low, 6-lobed, pistil ovoid, 2 mm. high, stigmas terminal and sessile; staminate flowers not seen: fruit obpyriform, 10–13 mm. long, 10 mm. wide at apex, yellow (fide Allen), black when dry, stigmatic scar lateral; endocarp brown, reticulate-channelled; endosperm ruminate.

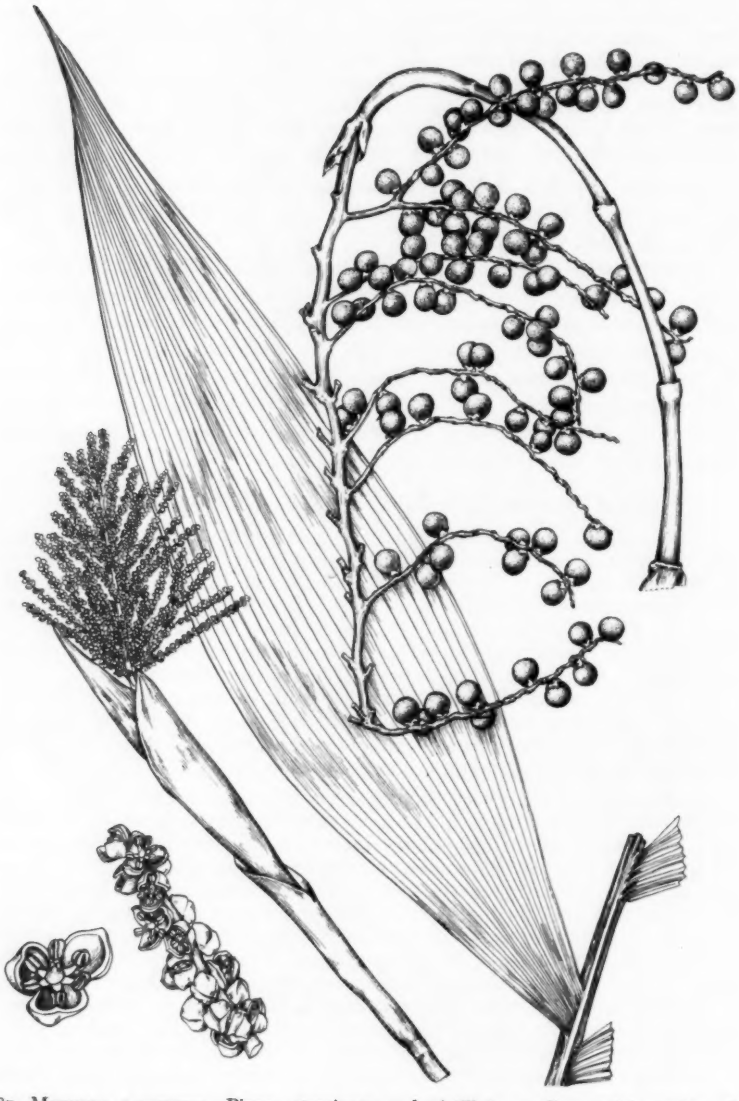
Panama, Province of Veraguas, forested slopes of Cerro Tute, vicinity of Santa Fé, altitude 2500 feet, March 25, 1947, *Paul H. Allen 4376* (Herb. Mo. Bot. Gard.).

Synechanthus panamensis, *S. Warscewiczianus*, Wendl., *S. angustifolius*, Wendl., and *S. ecuadorensis*, Burret, form a group of species probably representing a natural subgenus having simple rachillæ and ruminate endosperm (except for *S. ecuadorensis*, the fruit of which is unknown). From *S. Warscewiczianus* and *S. angustifolius*, *S. panamensis* differs in the obpyriform not elliptic fruit and in the shape and length of the pinnæ. From *S. ecuadorensis* it differs in having a six-lobed staminodial ring, more numerous and shorter pinnæ and a larger spadix.

† **Morenia latisecta,** H. E. Moore, spec. nov. Fig. 87.

Arbor ad 8 m. alta: folia regulariter pinnata, ad 1.3 m. longa; pinnæ glabræ, utrinsecus 11 vel plures, alternæ vel subopposite, inferiores et mediæ late lanceolatæ, versus apicem falcatæ, 40–60 cm. longæ, 9–12 cm. lata, superiores et terminales lanceolatæ, 25–39 cm. longæ, 3–5 cm. latæ: spadices staminati 6 intra vaginam, pedunculo ca. 23 cm. longo, spathis 3, tubulosis, ad apices patulis, rachi 12 cm. longa, rachillis 50 vel plures, simplicibus, 3–7.5 cm. longis; flores lutei, calyce minuto, petalis ovatis 2.6 mm. longis, staminibus 6: spadix pistillatus ca. 30-ramosus, pedunculo 40 cm. longo, 5-annulato, erecto, rachi pendula, 27 cm. longa, rachillis simplicibus, 12–20 cm. longis, ascendentibus sed apicibus pendulis: fructus (immaturus) globosus, 12 mm. longus, 10 mm. latus.

Caulescent, to 8 m. high (fide Schultes): leaves regularly pinnate, the basal .3 m. long, the upper 1.3 m. long (fide Schultes); sheath and petiole glabrous, striate; blade incomplete, received in five sections, those portions of the rachis seen totalling about 95 cm. in length with about 11 pinnæ on each side; pinnæ glabrous with prominent veins, green above, green with yellowish veins below, alternate to subopposite at intervals of mostly 6–8 cm. along the rachis, the lower and median broadly lanceolate, widest at the middle or above from a base 1.5 cm. along the rachis, 40–60 cm. long, 9–12 cm. wide, falcately tapered on the lower margin to a slender acuminate apex, the upper and terminal lanceolate, more closely spaced, more or less evenly tapered to a shorter apex, 25–39 cm. long, 3–5 cm. wide: immature staminate spadices borne within the sheath in a group of 6, the innermost pair developing first, the outermost last; flowering staminate spadix about 50-branched; peduncle 23 cm. long; spathes 3, tubular with flaring apices, sheathing the peduncle, the outer 12 cm. long, the inner



87. MORENIA LATISECTA. Pinna, staminate and pistillate spadices ×⅓; portion of staminate rachilla ×3; staminate flower ×4.

20 cm. long, exceeding the peduncle; rachis about 12 cm. long; rachillæ simple, 3–7.5 cm. long, closely spaced on the rachis; staminate flowers yellow, depressed and angled in bud, borne spirally in pairs covering the rachillæ, calyx minute, 0.6 mm. high, 3-lobed, the lobes deltoid, petals valvate, ovate, thick, about 3 mm. long, stamens 6, one-half to two-thirds as long as petals, pistillodium conspicuous, 3-lobed: fruiting spadix large, about 30-branched; peduncle 40 cm. long, bearing 5 spathe rings, erect, becoming cernuous toward the apex; innermost spathe 3.5 cm. long; rachis pendulous, 27 cm. long; rachillæ simple, 12–20 cm. long, ascending with pendulous apices; pistillate flowers not seen: immature fruit green (fide Schultes), spirally arranged, nearly globose, about 10 mm. wide, 12 mm. long; calyx 3 mm. high, deeply 3-lobed, the lobes entire or irregularly crenate, exceeding the corolla remains; endosperm not formed.

Colombia, Putumayo, Valley of Sibundoy, Sibundoy, altitude about 2225–2300 m., May 29, 1946, *R. E. Schultes & M. Villareal 7676.*

This species is distinct from all previously described Morenias in its broadly lanceolate median pinnæ 9–12 cm. wide. Other species have linear to linear-lanceolate pinnæ 1.5–5 or rarely 6 cm. wide at the middle.